Supreme Court, U. S.
FILED
AUG 30 1975
MICHAEL RODAK, JR., CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1975

NO. 75-324

EXXON CORPORATION, SHELL OIL COMPANY, AMOCO OIL COMPANY AND ATLANTIC RICHFIELD COMPANY,
Petitioners

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

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INDEX

	Page
Opinion below	1
Jurisdiction	2
Questions presented	2
Statutes and regulations involved	2
Statement of the case	3
Reasons for granting the writ	6
Conclusion	15
Appendix A (Opinion of Court of Appeals)	A-1
Appendix B (Court of Appeals Denial of First Petition for Rehearing)	B-1
Appendix C (Court of Appeals Denial of Second Petition for Rehearing)	C-1
Appendix D (Ship and Barge Regulation)	D-1
Appendix E (Section 110(a)(2), (c) of the Clean Air Act)	E-1
Appendix F (Section 391(a) of the Ports and Waterways Safety Act)	F-1
Appendix G (EPA Suspension of Final Compliance Date)	G-1
Appendix H (Payne Affidavit)	H-1
Appendix I (Boykin Affidavit)	I-1
Appendix J (Durland Affidavit)	J-1
Appendix K (Grimes Affidavit)	K-1
Appendix L (Benkert Letter)	L-1
Appendix M (Ginsburgh Affidavit)	M-1

CITATIONS

CASES — Page

Appalachian Power Co. v. Environmental Protection Agency, 477 F.2d 495 ..... 7, 11, 12
Buckeye Power Inc. v. Environmental Protection Agency, 481 F.2d 162 ..... 7, 12
Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 .. 11
Duquense Light Co. v. Environmental Protection Agency, 481 F.2d 1 12
Getty Oil Co. v. Ruckelshaus, 467 F.2d 349 12
Indiana & Michigan Electric Co. v. Environmental Protection Agency, 509 F.2d 839 13
Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 9
St. Joe Minerals v. Environmental Protection Agency, 508 F.2d 743 ..... 12, 15
South Terminal Corp. et al. v. Environmental Protection Agency, 504 F.2d 646 ..... 7, 13
Train v. Natural Resources Defense Council, Inc., No. 73-1742 (April 16, 1975) 6, 8, 10, 12, 15
Union Electric Co. v. Environmental Protection Agency, 515 F.2d 206 ..... 13, 15

STATUTES AND REGULATIONS

Clean Air Act of 1970, Section 110, 84 Stat. 1680, 42 U.S.C. § 1857c-5 ..... 2, 3, 5, 8, 11, 12, 13
Clean Air Act of 1970, Section 307, 84 Stat. 1707, 42 U.S.C. § 1857h-5 4
Ports and Waterways Safety Act of 1972, 86 Stat. 427, 46 U.S.C. § 391a 3, 15
40 CFR Part 51 7
40 CFR Section 52.2287 ..... 2, 4, 5
Texas Air Control Board Rule 503.2 4

MISCELLANEOUS

38 Fed. Reg. 16550 et seq. 3
38 Fed. Reg. 30633 et seq. 4, 11
40 Fed. Reg. 18437 5
40 Fed. Reg. 24185 5
S. 4358, Section 202(a), 91st Cong., 2nd Sess. (1970) 14
S. Rep. No. 91-1196, 91st Cong., 2nd Sess., page 59 (1970) 14
Grad, Treatise on Environmental Law, Vol. I 15

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v.

ENVIRONMENTAL PROTECTION AGENCY,
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PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

Exxon Corporation, Shell Oil Company, Amoco Oil Company and Atlantic Richfield Company petition for a writ of certiorari to review the decision and judgment of the Fifth Circuit Court of Appeals rendered in *State of Texas et al. v. Environmental Protection Agency*, No. 73-3540.

OPINION BELOW

The opinion of the Court of Appeals (App. A, *infra*, pp. A-1 to A-63) is reported at 499 F.2d 289.

JURISDICTION

The judgment of the Court of Appeals was entered on August 7, 1974. A timely petition for rehearing was filed on September 3, 1974, and denied on February 19, 1975 (App. B, *infra*, p. B-1). Thereafter, the Fifth Circuit granted petitioners leave to file a second petition for rehearing which was denied on April 3, 1975 (App. C, *infra*, pp. C-1 to C-2). On June 27, 1975, an extension of the time to file this petition for writ of certiorari to and including August 31, 1975 was granted (No. A-1056). The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

QUESTIONS PRESENTED

The questions presented for review by this Court are:

1. Whether the Administrator of the Environmental Protection Agency can lawfully promulgate control measures in a substitute implementation plan under Section 110(c) of the Clean Air Act, 42 U.S.C. § 1857c-5(c), without consideration of technological infeasibility, safety, and other public interest factors?

2. Whether the Administrator of the Environmental Protection Agency has statutory authority under the Clean Air Act to regulate vapor emissions from ships and barges despite Congress' deliberate deletion from the Act of provisions for control of vessel emissions?

STATUTES AND REGULATIONS INVOLVED

This petition involves the ship and barge hydrocarbon vapor recovery regulation of the Texas Transportation Control Plan, 40 C.F.R. § 52.2287 (App. D, *infra*, pp. D-1 to D-2), which was promulgated by Respondent

Environmental Protection Agency on November 6, 1973 pursuant to Sections 110(a)(2) and 110(c) of the Clean Air Act, as amended, 84 Stat. 1680, 42 U.S.C. § 1857c-5(a)(2), (c). (App. E, *infra*, pp. E-1 to E-4). Other relevant statutory and regulatory provisions include Section 201 of the Ports and Waterways Safety Act of 1972, 86 Stat. 427, 46 U.S.C. § 391a (App. F, *infra*, pp. F-1 to F-10).

STATEMENT OF THE CASE

On June 15, 1973, the Environmental Protection Agency (EPA) disapproved the implementation plan for attaining the photochemical oxidants ambient air quality standard developed by the State of Texas pursuant to the requirements of Section 110(a)(2) of the Clean Air Act, 42 U.S.C. § 1857c-5(a)(2).[1] 38 Fed.Reg. 16550. On November 6, 1973, EPA substituted its own plan, the "Texas Transportation Control Plan", for attaining the

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1. Following the establishment of "primary" and "secondary" national ambient air quality standards for specific air pollutants at levels requisite to protect "the public health" and "the public welfare", respectively, each State, pursuant to Section 110 of the Act, 42 U.S.C. §1857c-5, must adopt and submit to the EPA Administrator a plan providing for the implementation, maintenance and enforcement of the standards for air quality control regions within that State.

The Administrator must approve or disapprove each plan within four months of its submission. Section 110(a)(2), 42 U.S.C. §1857 c-5(a)(2). If the Administrator disapproves such plan or portion thereof as not "in accordance with the requirements of" Section 110, he must "promptly prepare and publish proposed regulations setting forth" a substitute implementation plan. Section 110(c), 42 U.S.C. §1857c-5(c). Within six months of the submission of the disapproved State plan, the Administrator must promulgate final regulations unless the State has "adopted and submitted" a revised plan determined by the Administrator to comply with Section 110 requirements.

photochemical oxidants standard in Texas.[2] 38 Fed.Reg. 30633. The EPA Plan consisted of the "disapproved" State plan plus 12 additional control measures for five air quality regions in Texas.

Pursuant to Section 307(b)(1) of the Clean Air Act, 42 U.S.C. § 1857h-5(b)(1), Exxon, Shell, Amoco and Atlantic Richfield filed timely petitions for review of the EPA Administrator's disapproval of the State of Texas plan and his promulgation of a substitute plan. On August 7, 1974, the Fifth Circuit held that the EPA had lawfully disapproved the State of Texas' implementation plan, and that some of the EPA's 12 new regulations were valid while others were either invalid or deferred pending further Agency consideration. See 499 F.2d at 321.

One of the regulations which the Fifth Circuit held valid and enforceable was the ship and barge regulation which requires control of hydrocarbon vapor emissions during the loading and unloading of vessels using port facilities within the Houston-Galveston 13-county air quality control region.[3] The Fifth Circuit upheld this regulation despite finding that "[t]he necessary control technology is not available," and that "[t]here is no basis whatever in the

2. Photochemical oxidants are formed in the atmosphere by the reaction of hydrocarbons with nitrogen oxides in the presence of sunlight. Both the State of Texas' and EPA's implementation plans contain control measures to control the emission of hydrocarbons into the atmosphere as a means of reducing the ambient level of photochemical oxidants.

3. Section 52.2287 of 40 C.F.R. is set forth in App. D at pp. D-1 to D-3. Also included is Texas Air Control Board Rule 503.2 which was amended by Section 52.2287. As promulgated, Section 52.2287 requires the installation of vapor recovery equipment, such as condensation or incineration systems, which reduce hydrocarbon emissions such that the aggregate partial pressure of the hydrocarbon vapors being emitted to the atmosphere will not exceed 1.5 psia.

record for concluding that a final compliance date of May 31, 1975 is technologically feasible." 499 F.2d at 317. The Court of Appeals ruled that these uncontested facts were legally irrelevant on the theory that Section 110 contemplates "plans which require control measures of less than certain technological feasibility." *Id.*

Following the Fifth Circuit's denial of their petitions for rehearing (see App. B and C, *infra*), petitioners applied to this Court on April 18, 1975, for a stay of mandate pending application for a writ of certiorari (No. A-863). On April 23, 1975, Justice Rehnquist entered a temporary stay, and the EPA Administrator suspended enforcement of the interim, but not final, compliance dates.[4] 40 Fed.Reg. 18437. Following this Court's denial of petitioners' stay application on April 28, 1975, the EPA Administrator on May 30, 1975 suspended enforcement of the final compliance date until October 1, 1975, 40 Fed.Reg. 24185 (App. G, *infra*, pp. G-1 to G-2).

Despite this extension and possible additional extensions until as late as May 31, 1977, compliance with the EPA regulation is and will continue to be technologically infeasible (App. H-K), thus necessitating review by this Court.[5] Without a definitive ruling by this Court barring

4. The interim dates established in Section 52.2287 were: (a) March 31, 1974 for letting contracts for emission control systems or process modifications, (b) July 31, 1974 for initiation of on-site construction, and (c) March 31, 1975 for completion of construction.

5. In his May 30, 1975 Federal Register notice, the EPA Administrator stated that EPA "intends to publish proposed amendments to the regulation within the near future" (see App. G, *infra*, p. G-2). On this basis petitioners requested an extension of time in which to file this petition for writ of certiorari. Petitioners were given until August 31, 1975 to file their petition.

EPA has yet to publish any proposed amendments, although EPA has indicated that possible amendments to the regulation may

the imposition of such technologically infeasible regulations, EPA can be expected needlessly to include similarly infeasible regulations at enormous economic costs in the numerous implementation plans yet to be finalized by EPA.

REASONS FOR GRANTING THE WRIT

I.

A. This Court has authoritatively construed the Clean Air Act as contemplating that an implementation plan, whether drafted by the State or EPA, provide "the most practicable and desirable methods of restricting total emissions." *Train v. Natural Resources Defense Council, Inc.* (NRDC), No. 73-1742, decided April 16, 1975, slip. op. at 18.

The decision of the Fifth Circuit conflicts with this Court's ruling in *Train v. NRDC*. Instead of requiring the "most practicable and desirable" approach, the court of appeals' opinion echoes EPA's unlawful disregard of petitioners' uncontested showing of technological infeasibility, safety hazards and severe economic impact in the Houston-Galveston area.

In *Train v. NRDC*, this Court specifically held that Congress "left to the States considerable latitude in determining specifically how the standards would be met." *Train v. NRDC, supra*, slip op. at 25. Indeed, "the State is at liberty to adopt whatever mix of emission limitations it deems best suited to its particular situation." (*Id.* at 17).

include an extension of the final compliance date until May 31, 1977, an expansion of the regulation to two other Texas Air Quality Control Regions and the restriction of the regulation to the loading and unloading of only gasoline. None of these possible changes diminish the urgent need for prompt resolution by this Court of the legal issues presented in this petition.

EPA's own regulations confirm that the State may consider a host of factors affecting the welfare of its citizens including technological feasibility, cost effectiveness, safety, and social impact when fashioning the "mix of emission limitations" contained in its implementation plan. See generally 40 C.F.R. Part 51.[6]

EPA disapproval of an implementation plan submitted by the State plainly does not dispense with this recognized necessity to assess "the cost-effectiveness" of control strategies, or permit disregard of their "social and economic impact."[7] Indeed, if anything, the need for a broad-range public interest inquiry is even more compelling if EPA supersedes the State's role and imposes

6. For instance Section 51.2 of the EPA's regulations and guidelines provides that:

> "Nothing in this part shall be construed in any manner:
>
> * * *
>
> "(b) To encourage a State to adopt any particular control strategy without taking into consideration the cost-effectiveness of such control strategy in relation to that of alternative control strategies.
>
> * * *
>
> "(d) To encourage a State to prepare, adopt, or submit a plan without taking into consideration the social and economic impact of the control strategy set forth in such plan, including, but not limited to, impact on availability of fuel, energy, transportation and employment. . . ."

7. In a case involving the EPA's promulgation of a substitute plan, the First Circuit in *South Terminal Corp. v. Environmental Protection Agency*, 504 F.2d 646, 676, fn. 33 (1974), rejected the view that the concerns expressed in the EPA regulations and guidelines at 40 C.F.R. Part 51 are "inappropriate." Moreover, two other courts of appeals have held that these regulations and guidelines are appropriate for development of a State implementation plan. *Appalachian Power Co. v. Environmental Protection Agency*, 477 F.2d 495, 505-506 (4th Cir. 1973), and *Buckeye Power, Inc. v. Environmental Protection Agency*, 481 F.2d 162, 169 (6th Cir. 1973).

EPA's "own mix of emission limitations" on the State. Section 110(c), 42 U.S.C. § 1857c-5(c).

Therefore, the question presented by this case is whether EPA can, consistent with this Court's *Train v. NRDC* decision, blatantly and consistently ignore technological, economic and social considerations when it supersedes the State's responsibility under Section 110. There can be little doubt that this is precisely what EPA did with regard to the ship and barge regulation in its substitute Texas plan.

For example, despite comments by petitioners and others at the EPA "public hearing" in July of 1973, the EPA blindly ignored the many serious technological and safety problems cited, and disregarded the severe economic impacts inherent in implementation of the regulation. The record in this case, consisting of thousands of pages, contains only *two sentences* of the EPA Administrator supporting the promulgation of the regulation, both of which relate to *assumptions* on the availability of technology. But even these two statements were discounted by the court of appeals in finding that there was "no basis whatever in the record" that compliance was "technologically feasible." 499 F.2d at 317.

Still more distressing was EPA's failure to consider the very serious and complex safety problems which impair the public health and welfare to a far greater degree than the failure to reduce hydrocarbon emissions during ship and barge loading and unloading operations. The danger of explosions, due to the volatility of hydrocarbon vapors when mixed with air and the many sources of ignition typical in a ship or barge loading or unloading operation, is beyond dispute. Thus, the United States Coast Guard has expressed deep concern to the EPA Administrator on the

matter,[8] since any explosion at a dock facility could, by chain reaction, approach catastrophic proportions, such as the 1947 Texas City disaster where upwards of 500 people were killed and 3,000 injured when explosions spread from a single ship to adjacent chemical plants and refineries, and then to residential and commercial areas.[9] Until these safety problems are solved EPA cannot reasonably require, and petitioners cannot responsibly install, vapor control systems for ship and barge loading and unloading operations.[10]

Neither is there any evidence in the record that the EPA Administrator considered the following social and economic impacts in the implementation of the ship and barge regulation:

(1) Lack of alternative means of transportation for petitioners' products, inevitable curtailment of production under such circumstances, with resultant adverse effects on employment and the supply of necessary energy products. See App. H-K, *infra*.

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8. See, e.g., the April 18, 1975 letter of Rear Adm. W. M. Benkert, Chief, Office of Merchant Marine Safety, to Russell Train, EPA Administrator (App. L, *infra*, pages L-1 to L-2).

9. Under the circumstances, it was critically important for EPA Administrator to take a "hard look" at these safety problems since his "decisions can literally mean survival of persons or property." *Portland Cement Association v. Ruckelshaus*, 486 F.2d 375, 394 (D.C. Cir. 1973).

10. The affidavits presented by petitioners in support of their application to this Court for a stay of the mandate, filed April 18, 1975 (No. A-863), show that a safe vapor control system is presently technologically infeasible and cannot be developed and installed until 1978 or 1979, if even then. App. H-K, *infra*, pages H-1 to K-4.

(2) Cost effectiveness of the EPA's regulation which even the EPA's calculations show would produce only minute reductions in hydrocarbon emissions[11] at enormous costs estimated at $1,200,000 per ship, excluding on-shore facilities.

(3) The discriminatory effect of applying the ship and barge regulation only to the Houston-Galveston Air Quality Control Region, including the probability that foreign-flag vessels and even domestic ships will avoid the region so as not to incur the very substantial expense of installing necessary, and potentially hazardous, control equipment when, and if, it should become available.

In sum, the public interest objections raised by petitioners bear critically upon any determination of the appropriate "mix of emission limitations" which are "best suited to [the] particular situation" of Texas. *Train v. NRDC, supra,* slip op. at 17.[12] Yet the EPA and the court of appeals either failed to consider or dismissed as irrelevant the safety and other problems and impacts inherent

11. The EPA calculated that only 2.7% of the needed 75% reduction in hydrocarbon emissions would be achieved by the ship and barge regulation. See 499 F.2d at 310, fn. 38. As demonstrated by the Ginsburgh affidavit before the Fifth Circuit, App. M, *infra,* the EPA overestimated the level of hydrocarbon emissions during ship and barge loading by a factor of 3 to 5. Subsequent research by petitioners, of which EPA is aware, confirms Dr. Ginsburgh's earlier studies and shows that the regulation will achieve only 0.4% of the needed reduction in hydrocarbon emissions.

12. In determining the "mix of emission limitations" and other control measures, the EPA must consider whether the ship and barge regulation because of its many problems and minimal benefit should be eliminated.

in implementing the ship and barge regulation. 499 F.2d at 317. See also 38 Fed. Reg. 30636.[13]

A definitive ruling by this Court reaffirming EPA's duty to consider the various technological problems and economic impacts of a control strategy as well as all aspects of the public interest is now imperative, lest EPA continue to disregard its statutory responsibilities in preparing substitute plans under Section 110(c) of the Clean Air Act. By providing much-needed guidance to EPA and the courts, which must eventually review substitute EPA implementation plans prepared for many other air quality control regions, this Court would not only clarify a situation which invites further litigation but also promote rapid air pollution control progress consistent with the public interest.

B. The various circuit courts of appeals are widely split over whether EPA and the States must consider technological infeasibility and other public interest factors in preparing implementation plans under Section 110 of the Clean Air Act. The decision of the Fifth Circuit in this case conflicts with decisions of the First, Third and Fourth Circuits.

As indicated by pending petitions for writ of certiorari filed by the Solicitor General and others, the courts of

13. Moreover, the failure to consider safety and other factors is contrary to this Court's holding in *Citizens to Preserve Overton Park v. Volpe,* 401 U.S. 402, 415-416 (1971), that all "relevant factors" must be considered by an Agency. See also *Appalachian Power Co. v. Environmental Protection Agency,* 477 F.2d 495, 507 (1973).

The postponement and revision procedures contained in the Clean Air Act and mentioned by the Fifth Circuit do not justify the imposition of an infeasible control strategy. These procedures only apply in extremely limited circumstances and are either too time consuming or time restricted to be of practical value. See 42 U.S.C. § 110(a)(3), (f).

appeals are in sharp disagreement over whether economic and technological feasibility considerations must be taken into account in EPA approval or disapproval of State implementation plans.

For example, the Third Circuit recently held that the EPA Administrator could disapprove the Pennsylvania implementation plan "if he found it technologically unworkable." *St. Joe Minerals v. Environmental Protection Agency,* 508 F.2d 743, 747 (1975), petition for a writ of certiorari filed June 28, 1975, No. 74-1650.[14] And previously the Fourth Circuit in *Appalachian Power Co. v. Environmental Protection Agency,* 477 F.2d 495, 505 (1973) sanctioned consideration by the EPA Administrator of economic and technological feasibility "in evaluating the state plan in connection with his exercise of the power to approve or disapprove."[15]

By contrast, the Sixth Circuit suggested in *Buckeye Power, Inc. v. Environmental Protection Agency,* 481 F.2d 162, 173 (1973) that "high cost-benefit, technological infeasibility and resource unavailability" could be considered in enforcement actions, but not "prior to

14. See also, *Getty Oil Co. v. Ruckelshaus,* 467 F.2d 349 (3rd Cir. 1972), *cert. denied,* 409 U.S. 1125 (1973); *Duquense Light Co. v. Environmental Protection Agency,* 481 F.2d 1 (3rd Cir. 1973).

15. Under the Third and Fourth Circuit decisions, the invalidity of infeasible regulations in a substitute EPA implementation plan follows *a fortiori.* For whatever the State's authority to impose more stringent limitations than required to meet the national standards, no such consideration applies when EPA drafts an implementation plan under Section 110(c), 42 U.S.C. §1857c-5(c).

Nor may such infeasible EPA regulations be justified as "technology forcing" since "so long as the national standards" may be attained by alternative control strategies, "there is no basis in the present Clean Air Act for forcing future technological developments." *Train v. NRDC,* supra, slip op. at 29.

the Administrator's approval of state plans." Similarly, the Seventh Circuit in *Indiana & Michigan Electric Co. v. Environmental Protection Agency,* 509 F.2d 839, 844 (1975), barred preenforcement consideration of "technological feasibility and economic impact" on the theory that these "are not among the factors which the Administrator is obliged to consider under Section 110(a)(2)."

Most recently, the Eighth Circuit ruled in a related jurisdictional context that "Congress intended to preclude economic and technological factors from the Administrator's consideration of whether to approve an implementation plan", citing the Fifth Circuit's decision on the ship and barge regulation as one of the cases supporting its holding. *Union Electric Co. v. Environmental Protection Agency,* 515 F.2d 206, 215, 218 (1975), petition for writ of certiorari filed June 9, 1975, No. 74-1542.

Finally, in another case involving promulgation of a substitute implementation plan by the EPA, the First Circuit, in affirming much of EPA's substitute Massachusetts plan in *South Terminal Corp. v. Environmental Protection Agency,* 504 F.2d 646, 681 (1974), held that the technological feasibility of EPA's regulations must be considered. In contrast to the Fifth Circuit's holding on the ship and barge regulation, the First Circuit ruled that the Administrator's action would be capricious and overturned if "costly but equally effective alternatives were rejected or the *requisite technology is unavailable.*" (*Id.* at 656; emphasis added).

In sum, the fundamental conflict among the circuits can be resolved only through a comprehensive decision by this Court addressing EPA's statutory responsibility

to consider technological feasibility as well as other public interest factors when approving or disapproving implementation plans submitted by the states, and when preparing substitute implementation plans in the circumstance of disapproval. Indeed, it is particularly appropriate to consider and resolve this conflict within the context of this case since technological infeasibility here results from very serious safety hazards which directly impinge upon the public health and welfare.

II.

The decision of the court of appeals also presents an important, unresolved question of EPA's statutory authority under the Clean Air Act to regulate hydrocarbon emissions from ships and barges.

The legislative history demonstrates that, in contrast to the expansive authority granted EPA to control emissions from other categories of mobile sources, Congress deliberately denied EPA power to regulate vessel emissions. Section 202(a) of the original Senate bill, S. 4358, 91st Cong., 2d Sess. (1970), expressly provided EPA authority to promulgate "standards applicable to the emission of all known substances of any kind or description from any class or classes of: (A) vessels, aircraft, commercial vehicle and non-commercial vehicle engines . . . ." The legislative history confirms that this provision was intended to apply to "the emission of *all* known pollution agents from vessels . . . ." S. Rep. No. 91-1196, 91st Cong., 2d Sess., p. 59 (1970) (emphasis added).

Yet EPA's authority to control vessel emissions was deleted by the Conference Committee, most likely be-

cause of conflicts with the Coast Guard jurisdiction over maritime matters, effects on international commerce and the major safety hazards already noted.[16] Reaffirming this purpose, Congress acted promptly thereafter to strengthen the Coast Guard's regulatory jurisdiction and to reconcile competing environmental and safety concerns through passage of the Ports and Waterways Safety Act of 1972, which explicitly authorizes rules and regulations designed to protect the "marine environment." 46 U.S.C. § 391a.

CONCLUSION

This petition for a writ of certiorari should be granted so that the conflicts between the Fifth Circuit and this Court's *Train v. NRDC* decision, as well as among the various circuits, regarding EPA's statutory authority and duty to consider technological infeasibility and related public interest factors can be comprehensively resolved together with other pending petitions for certiorari.[17]

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16. Notwithstanding the court of appeals' decision in this case, Congress plainly did not authorize "back-door" regulation of ship and barge emissions as stationary sources:

> "At present, there is no Federal legislation permitting the control of the emissions from ships, boats, or other vessels. The 1970 Clean Air Amendments on moving sources cover only automobiles and aircraft.
>
> * * *
>
> "It is also clear that the vessels, even while in port, are not included within the term stationary sources under the federal air pollution control laws since *stationary sources* are defined so as to exclude vessels." (Emphasis added). F. Grad, *Treatise on Environmental Law*, Vol. 1, p. 2-275 (1973).

17. *St. Joe Minerals v. Environmental Protection Agency*, No. 74-1650, filed June 28, 1975; *Union Electric Co. v. Environmental Protection Agency*, No. 74-1542, filed June 9, 1975.

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CERTIFICATE OF SERVICE

I hereby certify that three printed copies of the foregoing Petition for Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit has been mailed this 30th day of August, 1975, postage prepaid to:

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APPENDIX A

* * *

STATE OF TEXAS et al., Petitioners

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent

NO. 73-3540

United States Court of Appeals,
Fifth Circuit

Aug. 5, 1974.

* * *

[293]

BELL, Circuit Judge:

This case requires that we resolve a major dispute between the Environmental Protection Agency and the State of Texas, several of that state's political subdivisions, and numerous of its corporate citizens. The difficulties arose after the EPA determined that Texas' own air quality implementation plan for control of photochemical oxidant pollution[1] would not assure the attainment of

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1. Photochemical oxidants constitute one of several classes of pollutants identified in 40 C.F.R. Part 51 for which implementation plans are required, but are the only class at issue in this litigation. They are comprised of various chemical compounds and are responsible for the phenomenon commonly known as "smog." These pollutants, which can cause breathing difficulties and eye irritation, de-

federal ambient air quality standards by May 31, 1975, as required by Section 110 of the Clean Air Act Amendments of 1970, 42 U.S.C.A. § 1857c-5 (1974 Supp.). Pursuant to its statutory authority and duty,[2] the EPA disapproved the Texas plan and issued proposed regulations which would, in its opinion, insure attainment of the air quality standard. These regulations adopted the measures contained in Texas' plan, but also imposed additional controls. After holding public hearings, the EPA promulgated final regulations which in some respects reflected concerns and priorities revealed at the hearings, but which nonetheless imposed on five of the six involved air quality control regions (AQCR's)[3] requirements more severe

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rive their name from the process by which they are formed, to wit, oxidation reactions triggered by sunlight and involving nitrogen oxide, hydrocarbons and atmospheric oxygen. Since sunlight and oxygen can't be controlled, and nitrogen oxide is difficult to control, strategies aimed at photochemical oxidants rely on control of hydrocarbon emissions. These emissions occur during the production, storage, transportation and use of a variety of petroleum products. For more detail, see the EPA publication, AP-63, *Air Quality Criteria for Photochemical Oxidants*.

2. 42 USCA § 1857-5(c) (1974 Supp.).
The structure of the 1970 Amendments, the criteria against which state plans must be considered, and the duties of the EPA have been discussed by this court in Natural Resources Defense Council, Inc. v. EPA, 1974, 489 F.2d 390 at 394-396 (stayed by U. S. Supreme Court June 12, 1974).

3. Texas is divided into 12 AQCR's but we are concerned with only 6. Five of the remainder are classified as Priority III for photochemical oxidants, and thus the state's implementation plan need not assure that they attain the national standard. *See* 40 C.F.R. §§ 51.3 (b)(1)(iii), 51.14. The twelfth region was included in Texas' plan, but was not dealt with in the agency action here under review. The omission occurred because that AQCR also encompasses southern Louisiana, and actions concerning it were delayed until the EPA could consider Louisiana's plan.

[294]

than those in the Texas Plan. *See* 38 Fed.Reg. 30633-51 (Nov. 6, 1973).

Twenty-five separate petitions for review were timely filed, and all have been consolidated into the case before us. On Feb. 28, 1974, a panel of this court granted a stay pending appeal as to those portions of the EPA's regulations which go beyond the state's proposed plan. That panel also ordered that this appeal be heard on an expedited basis. Since the measures in the state's own plan are not in dispute and have not been stayed, this litigation has not delayed their effectiveness. As we will discuss specifically at several points in this opinion, these state controls account for the bulk of the emissions reductions needed to meet the oxidant standard.

The principal questions presented are whether it was proper for the EPA first to determine that the state's plan was inadequate, and then to promulgate its own plan incorporating more onerous regulations. While a negative answer to the first question would settle the second question, an affirmative answer to the first issue is not similarly dispositive. It is possible that the EPA could properly determine that Texas' plan would not insure attainment of quality standards, but would be arbitrary, capricious, or beyond its authority, in its determination of the nature and quantity of additional control measures. We hold that the EPA determined in a legal and enforceable manner that the state's plan was inadequate. However, we also hold that certain of the EPA's additional regulations are either invalid or must be deferred for further agency consideration. The specific effects of our various holdings,

on a region-by-region and regulation-by-regulation basis, are summarized at the close of the opinion.

The factual issues are numerous and complex. We will therefore first outline the elements of the dispute. We will then address ourselves to the standard of review applicable in this case, and will then proceed to a seriatim discussion of the several contentions raised by petitioners.

THE DISPUTE IN OUTLINE

[1] Determining the measures required to meet air quality standards for photochemical oxidants involves a multistep analytical process. Initially, of course, it is necessary to set the standards. These however may not be challenged in this proceeding,[4] and petitioners do not openly do so. The second step, since the control strategy for oxidant pollution relies on control of hydrocarbon emissions, see note 1 *supra,* is to determine the relationship between the quantity of those emissions and the resultant maximum level of oxidants.[5] This relationship

4. The national ambient air standard for photochemical oxidants is expressed as 0.08 parts per million (ppm) of ozone, this being a maximum one-hour concentration not to be exceeded in more than one hour a year. While ozone is but one of numerous photochemical oxidants, it is a readily measured one and is accepted as a reliable indicator of overall oxidant pollution.

The standard was promulgated at 36 Fed. Reg. 22384 (Nov. 25, 1971), and is found at 40 C.F.R. § 50.9 (1973).

Under the provisions of 42 U.S.C.A. § 1857h-5(b)(1), petitions for review of a national ambient air quality standard may be filed only in the Court of Appeals for the District of Columbia.

5. For the sake of brevity, we will throughout this opinion refer to "oxidants" when we mean "photochemical oxidants," and to "maximum" oxidant concentration when we mean the second-highest concentration. The latter refinement reflects the fact that the national standard permits one occurrence per year of a one-hour concentration exceeding 0.08 ppm.

can be expressed as a "reduction model" which shows, for each current maximum level of oxidant pollution, the percentage reduction in hydro-

carbon emissions that is necessary to achieve the oxidant air quality standard. These models are normally displayed in graphical form, as illustrated in Figure 1. Petitioners raise as an important issue the EPA's choice of reduction model.

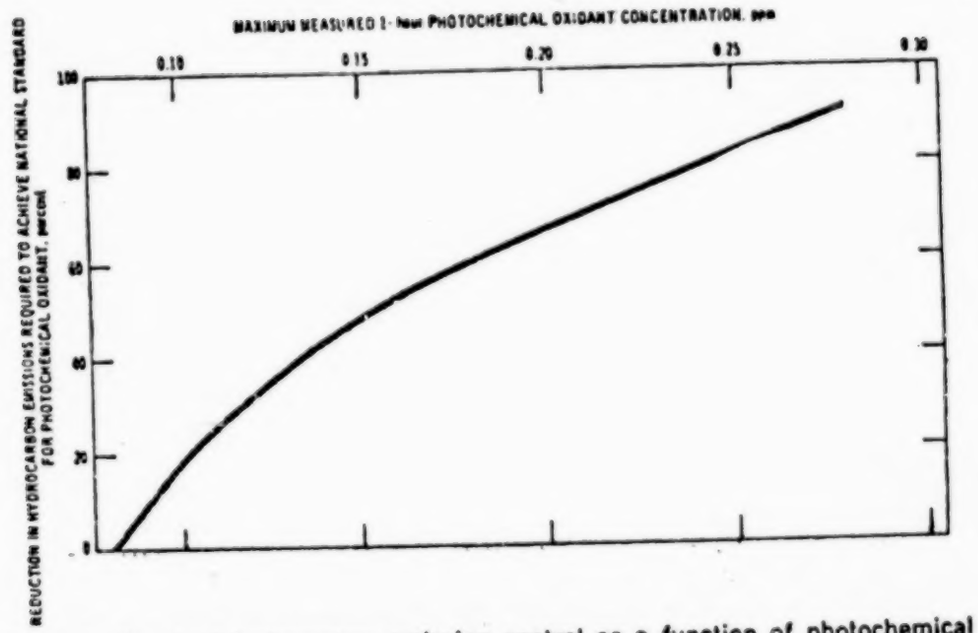

Figure 1. Required hydrocarbon emission control as a function of photochemical oxidant concentration.

The next step is determination of where on the reduction model curve a given AQCR is located. That is, in order to derive from the model the required reduction in hydrocarbon emissions, the existing level of oxidant pollution must be determined. We note, with some relief, that the parties appear to agree on this point, so that the reduction model issue is the only source of dispute as to how great are the necessary reductions.

Finally, there must be a prediction of the effect, in terms of reducing hydrocarbon emissions, of each control measure. As will be discussed below, there is considerable controversy on this point, especially as to the state's proposed requirements.

To summarize, petitioners and the EPA differ as to the model which determines how great a reduction in hydrocarbon emissions is necessary, and also as to how effective in achieving the required reductions particular measures will be. In general, the state's calculations indicate that the ambient air quality standards can be attained in each AQCR through its Regulation V, imposing extensive controls on stationary sources, such as factories and refineries.[6] The EPA's position is that

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6. These calculations assume, as they are permitted to do, 40 C.F.R. § 51.14(a)(1), that federal motor vehicle emission standards will result in significant emission reductions independent of any measures contained in the state's plan. Part of Texas' difficulty in achieving the standards by 1975, without relying on transportation-related controls, is that the compliance date for federal automobile emission standards has been extended beyond 1975. Partly as a result of this, and partly because a number of completely uncontrolled (pre-1968) cars will still be operating in 1975, that year is the most difficult one facing Texas. By 1977 a number of the measures required to meet the 1975 deadline will be unnecessary. *See* table at 38 Fed. Reg. 17800 (July 3, 1973). However, the statute permits an extension of a region's deadline only if the standard can't be met by "reasonably

the state not only underestimates the reductions required to meet air quality standards but also overestimates the reductions to be obtained by its plan. Thus the EPA found it necessary in five of the six regions to impose varying degrees of control on transportation-related emissions, and in one of those regions also to prohibit the construction of additional stationary pollution sources.

Finally, petitioners attack various of the EPA's required control measures on grounds more specific than their general claim that the state's calculations are correct and its plan adequate. Part IV of this opinion will deal with these more particularized issues, as well as with the related issue whether the EPA erred in its failure to grant Texas a blanket two-year extension of the target date for attainment of the oxidant air quality standard.

1. THE SCOPE OF REVIEW

[2] While the parties do not seriously dispute the basic standard of review, we think it wise for us to state that standard before applying it to the issues before us. The statute provides for review by the appellate courts of the agency's actions with respect to a state's implementation plan, 42 U.S.C.A. § 1857h-5(b)(1) (1974 Supp.), but does not specify the standard of review. In this situation courts have been applying the standard set forth in Citizens to Preserve Overton Park v. Volpe, 1971, 401 U.S.

available alternative means." 42 U.S.C.A. § 1857c-5(e)(1)(B). The EPA considers certain transportation-related controls as being "reasonably available." Our own view of this issue is discussed below at pp. 314-315, 317.

402, 91 S.Ct. 814, 28 L.Ed.2d 136. *See* Buckeye Power, Inc. v. EPA, 6 Cir., 1973, 481 F.2d 162, 170-171; Appalachian Power Co. v. EPA, 4 Cir., 1973, 477 F.2d 495, 505-507.

Overton Park similarly dealt with review of agency action which was based upon neither an adjudicatory hearing nor the rulemaking provision of the Administrative Procedure Act, 5 U.S.C.A. § 553.[7] Likewise, the statute authorizing review did not specify the scope of review. In these circumstances the Court turned to the generally applicable paragraphs of section 706 of the Administrative Procedure Act, 5 U.S.C.A. § 706, characterizing these as requiring "the reviewing court to engage in a substantial inquiry." 401 U.S. at 415, 91 S.Ct. at 823, 28 L.Ed.2d at 153. Three particular inquiries were specified: (1) whether the action was within the scope of the agency's authority; (2) whether the agency conformed to procedural requirements; and (3) whether the agency decision was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 401 U.S. at 415-417, 91 S.Ct. at 823, 28 L.Ed.2d at 153-154.

The first two of these requirements are relevant in the case *sub judice* only to the validity of several particular control measures imposed by the EPA to bring the Texas plan up to its standards. The third, however, is of central importance, being the basis for most of petitioners' complaints. We thus will quote the Court's statement as to what it involves:

7. The rulemaking before us is pursuant to the Clean Air Act Amendments of 1970, 42 U.S.C.A. § 1857c-5 (1974 Supp.). Were it APA § 553 rulemaking, the applicable standard would be that of substantial evidence. *See* 5 U.S.C.A. § 706(2)(E).

"To make this finding the court must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment. . . . Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency."

[297]

401 U.S. at 416, 91 S.Ct. at 823, 28 L.Ed.2d at 153.

[3] In applying this standard, our review must be based not only upon the agency's explication of "its course of inquiry, its analysis and its reasoning," Appalachian Power Co. v. EPA, *supra,* 477 F.2d at 507; Ely v. Velde, 4 Cir., 1971, 451 F.2d 1130, 1138-1139, but also upon the full record before the agency. *Overton Park, supra,* 401 U.S. at 419, 91 S.Ct. at 825, 28 L.Ed.2d at 155. Only by our own study of the record can we resolve the factual disputes between the parties, much less hope to "engage in a substantial inquiry" into the agency's action.

We do add a caveat, however, while the *Overton Park* mandate does require that we base our review on the entire record before the agency, we do not interpret it to require that we plunge into the record unaided by the parties. The record's length is on the order of 10,000 pages, and it is both technical and poorly organized. Lest we make of this case a career, we must generally restrict our consideration to the parties' specific citations.[8]

8. To assure that this procedure did not cause us to reject contentions for which support in the record does exist, we accorded counsel for the parties a post-submission opportunity to supply us with relevant citations. This hearing was in addition to oral argument and a pre-argument conference. *Cf.* Rule 33, F.R.A.P.

II. HOW GREAT MUST THE REDUCTIONS BE?

Petitioners first challenge to the EPA's analysis concerns its reduction model. As has been stated, this model determines, for each pre-control level of oxidant pollution, how great must be the reduction in hydrocarbon emissions to attain the ambient air quality standard for oxidants. The implementation plan submitted by the state was based on a reduction model requiring, for a significant range of oxidant pollution, considerably lower emission reductions than does the model used by the agency. The result, as shown in Table 1, is that for four of the six AQCR's the EPA determined that the state's reduction target was too low.[9]

TABLE 1

PERCENTAGE REDUCTION REQUIRED

AQCR		Second-Highest 1-hour ozone measurement	EPA Reduction Model (straight rollback)	Texas' Reduction Model
3	(Austin-Waco)	0.109	27	18
5	(Corpus Christi)	0.184	56	62
7	(Houston-Galveston)	0.320	75	75
8	(Dallas-Fort Worth)	0.120	34	24
9	(San Antonio)	0.145	45	40
11	(El Paso)	0.120	34	25

As a general matter, the EPA has required that states use the reduction model contained in Appendix J to 40 C. F.R. § 51.14 (1973). However, in sub-

9. Why the Texas model does not indicate lower reductions for Regions 5 & 7 is explained below in note 14.

[298]

mitting its plan Texas utilized a different model on the grounds that it was employing more sophisticated methodology, based not on total hydrocarbons emitted into the atmosphere, but rather upon hydrocarbon emissions which react with nitrogen oxides to form oxidant pollutants.[10] Since it is only reactive hydrocarbons which contribute to oxidant pollution, the Texas approach is theoretically attractive. However, reactive hydrocarbons have not yet been the subject of extensive pollution control study, and the resulting lack of knowledge restricts the usefulness of reactive hydrocarbon pollution control plans. One important unknown is the configuration of the appropriate reduction model.

The EPA concluded that Texas' reduction curve was not supported by technical data, and was based on impermissible assumptions. However, rather than require that Appendix J be applied to the reactive hydrocarbon approach, it determined that the most reasonable model to use in these circumstances would be the "straight rollback" model.

This model is essentially a method of coping with inadequate information by assuming that reductions in oxidant pollutants will be proportional to reductions in

10. Although the EPA doubts that any hydrocarbon other than methane is completely nonreactive, it accepts that certain other hydrocarbons are sufficiently nonreactive to be disregarded, at least in part, in formulating an implementation plan for Texas.

"Reactive hydrocarbons," which completely excludes the nonreactive component of total hydrocarbons, must be distinguished from "nonmethane hydrocarbons," which excludes only the single nonreactive substance methane. While considerable data is available as to the methane component of particular emission sources, and as to the relation between nonmethane hydrocarbons and resultant oxidant pollution, little data exists about reactive hydrocarbons.

reactive hydrocarbon emissions. The agency does not contend that the model is an accurate representation of reality, but it does contend that there is no information to support divergences from it, either in the direction of higher reduction requirements, as with Appendix J and part of the Texas curve, *see* note 14 *infra,* or in the direction of lower reduction requirements, as in the case of most of the Texas curve. Basically the EPA's position is that in the absence of contrary indications, and given the statutory necessity of accepting some model, the simplistic proportional rollback model is a reasonable resolution.

We will first consider the agency decision to reject the model on which Texas based its plan. We will then consider the agency's use of the straight rollback model.

A.

In rejecting Texas' reduction model the agency pointed out defects which have not adequately been answered on this appeal. Initially, for all practical purposes the state supplied no theoretical or empirical support for its novel model.[11] Upon further inquiry, the EPA learned that the

11. Material accompanying the state's plan when it was transmitted to the EPA merely stated that, "A reactive carbon compound control strategy is employed and an oxidant non-methane hydrocarbon relationship was formulated using the publication *Air Quality Criteria for Nitrogen Oxide* (AP-84) as the basis." Record, page 4188. It is understandable that this statement, combined with the Texas model, might confuse the EPA, for the only relevant data in the cited publication is the very data from which the EPA derived its Appendix J reduction model.

Texas' brief also cites us to a study entitled "Hydrocarbon Control Strategies for the State of Texas." The context of the citation indicates that the study should explain the derivation of the Texas reduction model. We have reviewed this 85-page document, but have found no such material.

state had modified Appendix J[12] by grasping upon the fact

[299]

that no reliable data exists connecting hydrocarbon emissions and relatively low maximum levels of oxidant pollution (below .13 ppm but above the national standard of .08 ppm). Faced with this same information gap, the EPA had determined, by a method which is not disclosed in the record, that a maximum oxidant level of .08 would be associated with a nonmethane hydrocarbon concentration of .17 ppm. By contrast, the Texas model assumed the appropriate figure to be in the neighborhood of .20 or .21—the level of hydrocarbons which Appendix J associates with an oxidant pollution level of slightly below .10 ppm.[13] The effect of this assumption, for the four

12. The state's brief contends that its curve improves on Appendix J because it is derived from data in AP-84 which relates oxidant levels with ***nonmethane*** hydrocarbons whereas, according to the state, Appendix J is based on different data in AP-84 relating oxidant levels to *total* hydrocarbons. The only difficulty with this proposition is that Appendix J also was derived from the AP-84 data dealing with ***nonmethane*** hydrocarbons. The state's confusion is excusable, however, since nothing in 42 C.F.R. Part 51 discusses the derivation of Appendix J, and the instructions for its use refer only to "hydrocarbon emissions reduction," not "nonmethane hydrocarbon emissions reduction." *See* 42 C.F.R. § 51.14(c)(4). Also contributing to the confusion is the EPA's carelessness in distinguishing between total and nonmethane hydrocarbons. For example, in the preamble to the final promulgation of its Texas regulations the EPA states that "the data base embodied in Appendix J was derived from oxidant and ***total hydrocarbon*** areometric data" (emphasis added). 38 Fed. Reg. 30627 (Nov. 6, 1973).

We have verified that Appendix J was derived from the nonmethane data in AP-84 by comparing it with that data and also, pursuant to an understanding amongst the parties, by obtaining information from the EPA personnel who actually created Appendix J.

13. On this basis the EPA concludes that the Texas plan in effect sets .10 as the oxidant level to be achieved. This is true only if Appendix J is accurate in setting .17 ppm as the nonmethane hydrocarbon concentration associated with .08 ppm maximum oxidant pol-

regions below .15 oxidant concentration, was to significantly lower the necessary reduction in hydrocarbon emissions,[14] as shown in Table 1, *supra*.

lution. On the record before us we are unable to determine whether .17 is accurate, or even more accurate than the state's figure of .20 or .21 (or the .24 used by Harris County in a post-argument submission). However, we need not determine which is most accurate, for our concern is solely whether the agency's rejection of Texas' model was arbitrary and capricious.

We add a note of caution: our characterization of how Texas derived its reduction model is somewhat speculative, since Texas has not seen fit to explain either its calculations or assumptions. Our understanding of the Texas model is somewhat different from that of the EPA, although it is based on the EPA's version of interviews with state officials, as well as on our own study of the model. It is roughly consistent with the reduction requirements submitted by Texas, and also gives Texas more credit for attention to theoretical niceties than does any alternative.

14. While the difference between .17 and .20 may seem small, it is very significant at the lower hydrocarbon concentrations. For example, if the existing nonmethane hydrocarbon level in a region is .25 ppm, the .17 figure requires a reduction of 32 per cent [(.25-.17) ÷ (.25) = (.08) ÷ (.25) = .32], while .20 requires a reduction of only 20 per cent [(.25-.20) ÷ (.25) = (.05) ÷ (.25) = .20].

That the Texas model does not indicate lower reduction requirements for Regions 5 and 7 may be briefly explained. As the oxidant pollution level increases, the effect of the difference between .17 and .20 becomes less significant, and the Texas curve closely approaches Appendix J (which, after all, is based on the same data). In fact, Texas apparently abandoned any distinction above oxidant levels of .17 ppm. Appendix J requires greater hydrocarbon reductions than does a straight rollback model, and this is especially true above oxidant levels of .15 ppm. The result is that for Region 5 (.184 ppm oxidant level), the Appendix J/Texas model requires a 62 per cent reactive hydrocarbon reduction, while the EPA's straight rollback model requires only 56 per cent.

As for Region 7, both models indicate an identical 75 per cent reactive hydrocarbon reduction because, for oxidant concentrations above .28 ppm, both the Appendix J and Texas models adopt the straight rollback approach. The EPA permits this for two reasons: first, little data exists relating these very high oxidant levels to antecedent hydrocarbon concentrations; second, such data as is available, and reasonable extrapolations from data for the lower pollution levels, indicate reduction requirements approaching 100 per cent. This effect, as well as the basic characteristics of the various reduction models relevant to this litigation, is also apparent from Figure 2.

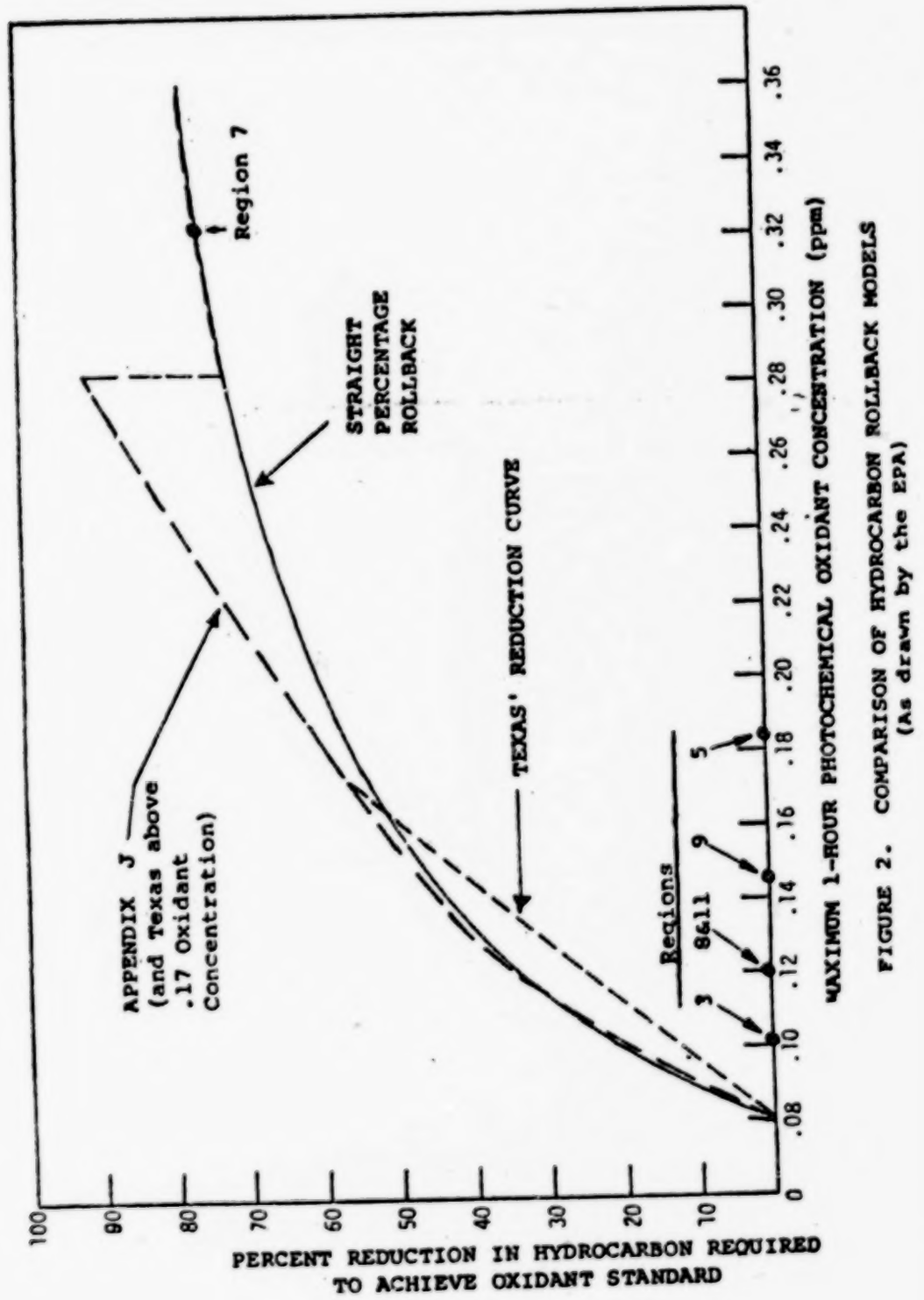
Region 7
STRAIGHT PERCENTAGE ROLLBACK
TEXAS' REDUCTION CURVE
APPENDIX J (and Texas above .17 Oxidant Concentration)
Regions 5 9 8&11 3
100 90 80 70 60 50 40 30 20 10 0
.08 .10 .12 .14 .16 .18 .20 .22 .24 .26 .28 .30 .32 .34 .36
PERCENT REDUCTION IN HYDROCARBON REQUIRED TO ACHIEVE OXIDANT STANDARD
MAXIMUM 1-HOUR PHOTOCHEMICAL OXIDANT CONCENTRATION (ppm)

FIGURE 2. COMPARISON OF HYDROCARBON ROLLBACK MODELS
(As drawn by the EPA)

[4] We can summarize the situation confronting the agency when it chose to reject Texas' reduction model. The model was novel, yet unsupported by data, theory, or even meaningful explanations. It purported to be appropriate for nonreactive hydrocarbons, yet was explicitly based on data for nonmethane hydrocarbons.[15] Finally, it was significantly different from the model the EPA derived from the same data, and even if the EPA model was not known to be accurate, it was part of a promulgated regulation which had been subjected to prior public scrutiny and comment. In these circumstances we cannot conclude that the agency's rejection of Texas' model was arbitrary or capricious.

B.

[5] We must now consider the EPA's use of a straight rollback model, which model it acknowledges to be based upon a simplistic assumption rather than experimental data or proven theory. While we are uneasy that such an unreliable construction should be the basis of wide-ranging government action, we do not consider the use of the straight rollback model to be arbitrary and capricious.

The statute requires implementation plans which will insure attainment of the national air quality standards. To design such plans it is necessary to utilize some model relating reductions in antecedent emissions to resulting reductions in pollutant concentrations. In the absence of sophisticated information, the EPA has been forced to

15. As discussed above in note 10, methane is but one of a number of nonreactive hydrocarbons.

rely on crude assumptions. We cannot object, for it is not our role to judge whether the EPA's projections are accurate, but only whether they represent arbitrary or capricious exercises of its authority. Necessity, which has mothered the EPA's invention of this model, also protects it from a judicial insistence on greater reliability.[16]

Further, we think it significant that the straight rollback model is, in an important sense, neutral, in that it establishes as a starting point the common-sensical proposition that pollutants will be reduced proportionally to reductions in their chemical precursors. Deviations from this assumption are to be permitted or required only when supported by empirical data or sound theory. Such a stance is not arbitrary and capricious, and is readily accepted by Texas for maximum oxidant concentrations above about .28 ppm (as discussed in note 14 *supra*, for these high pollution levels the EPA permits states to abandon Appendix J and use the much less stringent straight rollback model; it does so not only to avoid disruptive reduction requirements, but also because no solid data relates oxidants and hydrocarbon emissions for these high levels).

[6] To summarize, we conclude that the EPA was not arbitrary or capricious in its decisions to reject Texas' proposed reduction model and to substitute a straight rollback model. By this conclusion we support the agency's determination that higher emissions reduction targets are required in Regions 3, 8, 9, and 11, as indicated by Table 1 above.

16. Decisions which are not arbitrary and capricious in the light of existing knowledge may become so by dint of scientific advances. By its use of estimations and sparse data, the EPA creates a continuing responsibility to develop, review and apply updated and more sophisticated information.

III. REDUCTIONS TO BE OBTAINED

The second broad source of controversy between the state and EPA concerns the reduction in hydrocarbon emissions expected from the state's control of stationary sources. While the EPA's analysis exacerbates the problem in Regions 3, 8, 9, and 11 (in which the EPA reduction model in any case requires higher reduction targets), its impact is at its greatest in Region 7, the Houston

[302]

ACQR. In Region 7 both the state and the EPA used a proportional rollback model,[17] and they thus agreed that the implementation plan must insure a 75 per cent reduction in reactive hydrocarbon emissions. However, they do not agree on the reduction to be obtained from Texas' Regulation V, which controls stationary sources. While Texas believes this will result in a 75 per cent reduction, the EPA puts the figure at 65.5 per cent. Thus the EPA has required additional control measures aimed principally at transportation-related emissions.

As with the case of the appropriate reduction model, this controversy has its roots in Texas' reactive hydrocarbon approach. The problem arises in determining the reactive component of total hydrocarbon emissions from each emission category. In general, the agency has determined that reactive hydrocarbons constitute a smaller percentage of total stationary source emissions than has the state, and thus that stationary sources are responsible for a smaller percentage of overall reactive emissions. For example, in Region 7 the EPA calculates that 294,000

17. *See* note 14, *supra*.

tons per year of *reactive* hydrocarbons are emitted from stationary sources, and 106,000 tons per year from mobile sources. This compares with the state's calculations of 481,000 and 99,000, respectively.[18] Translated into percentages, the EPA attributes 73 per cent of total reactive emissions to stationary sources, while the state attributes 83 per cent. The result of the EPA's calculations is that the state's highly effective Regulation V, unaided by transportation-related controls, does not affect a sufficiently large proportion of the total to achieve the 75 per cent overall reduction.

As we did in the case of the reduction model controversy, we will approch the question in two stages. We will first consider the agency's rejection of Texas' calculations, and then consider petitioners' challenges to the calculations actually used by the EPA.

A.

The state's plan, as originally submitted, was quite summary in nature. It simply stated existing and projected reactive hydrocarbon emissions. The only explanation was by way of reference to a study entitled "Hydrocarbon Control Strategies for the State of Texas," Document 4 of the record.

The referenced study to some extent does deal with determining the reactive component of each source category's total hydrocarbon emissions. Of critical importance are the chemical processing and refinery categories. The study states, "For fixed chemical sources the reactive emissions were determined from a review of the inventory,

18. All data is for 1972, which is the base year for Region 7.

source by source, for the significant emitters. For refinery sources the basis from the Radian Report was used."

Bolstering Texas claim, that it determined the reactive component of chemical sources by separately considering each source, is a rather confusing table which lists plant-by-plant emissions for the Harris County chemical industry.[19]

[303]

For large sources the table contains three columns, with the headings "Emission Inventory," "Adjusted Inventory," and "Reduced Inventory." Nowhere does the study define the significance of each column, although it is clear that "Reduced Inventory" is the final reactive inventory. While a note to Texas' table seems to indicate that many of the "Emission Inventory" entries were *already reduced* for

19. While "Hydrocarbon Control Strategies for the State of Texas" does state that the Harris County source-by-source approach was "expanded to encompass all affected Regions," no source-by-source data was included in the study for any other region.

The record does contain a document entitled "Report on Hydrocarbon Study for Control Strategy for Industry Point Sources in Region 7" (Document 14). This report is identical to material in "Hydrocarbon Control Strategies," except that it employs a source-by-source approach for all of Region 7, not merely Harris County. For some unexplained reason this region-wide material did not accompany Texas' proposed plan and appears not to have been brought to the EPA's attention during its consideration of the region-wide report was prepared some 5½ months prior to the Harris County material submitted with the Texas plan.

Our disposition of this case is not affected even if we assume that the EPA should have evaluated Texas' plan on the basis of the region-wide report (which apparently was part of the record before it), rather than of the Harris County material actually accompanying the plan. The region-wide report has precisely the same deficiencies as are identified in the text with regard to the Harris County material.

nonreactive hydrocarbons, it is by and large only these entries which show reductions as one moves from the "Emission Inventory" column to the "Reduced Inventory" column.

An additional difficulty with the source-by-source data in the supporting study's tables is that nowhere is it specified whether the tables contain 1970 raw data or adjusted data for 1972.[20] The result is to restrict even further the meaning and usefulness of these tables.

So far as we can determine, Texas never presented to the agency additional material demonstrating how its source-by-source survey was conducted and why it should be accepted as reliable. Further, the results produced by Texas' methodology were suspect by comparison with existing data from other states. Whereas studies of chemical industries in California and Louisiana showed reactive hydrocarbons to constitute about one-half of total hydrocarbon emissions, Texas' Harris County "Reduced Inventory" equaled 86 per cent of its "Emission Inventory."[21]

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20. The study itself states that Texas obtained its 1972 data by increasing 1970 data 20 percent (to account for underreporting) and then applying a growth factor. The tables containing the source-by-source information are from a separate report and were appended to the study merely to illustrate the method used by Texas, and do not necessarily state the study's results. Yet these tables, and the explanatory material accompanying them, make no mention of either growth or underreporting adjustments.

21. Similar calculations using Document 14, discussed in n. 19, yield 75 per cent. Whether these figures have as much significance as the EPA accorded the 86 per cent figure is open to question. We have already indicated how confusing and poorly-defined are the tables from which they were derived.

As for the percentage of total chemical processing emissions which Texas actually claimed as reactive, we cannot say. It is indicative of how poorly documented was the state's plan that nowhere do there appear any figures for total hydrocarbons or for reactive hydrocarbons broken down by source category (the data submitted with Texas' plan includes a single, reactive hydrocarbon figure for "Point Sources" for each region; "Point Sources" consists of eight source categories, including chemical processing and petroleum refining). In short, it is impossible to determine for each category the percent of total emissions claimed as reactive in the state plan. This is true even when one supplements the state's data with the EPA's own figures for total hydrocarbon emissions from each source category.

[7, 8] We conclude that the EPA was not arbitrary or capricious when it rejected Texas' chemical processing reactive hydrocarbon inventory. The figures submitted by Texas were not only apparently quite different from those expected by the EPA, but they were unsupported by intelligible explanations or source material. We recognize the possibility that we are doing Texas an injustice by this decision, for it may be that in fact its calculations can be supported. However, this is a factual matter subject to proof. If Texas is correct we are confident that it can present its supporting data in a sound, orderly and convincing manner.[22] No such presentation having been made in this proceeding, we will not order the EPA to accept results which are apparently at odds with existing knowledge of the reactive/nonreactive makeup of chemical plant hydrocarbon emissions.

[304]

When we turn to the state's data regarding refineries, we find that it is even sketchier and more conclusory than that for chemical processing. As quoted above, the study supporting the Texas plan stated that to determine the reactive component of hydrocarbon emissions it had used

22. The method by which Texas may now seek acceptance of its chemical processing inventory is the submission to the EPA of a revision of the plan that results from this litigation. *See* 42 U.S.C.A. § 1857c-5(a)(3).

"the basis from the Radian Report," a study presented to the EPA in 1972 by a Texas consulting organization. The use in this context of that report is difficult to understand. As far as we can tell, it deals strictly with total hydrocarbons and provides neither data nor methodology for calculating the reactive component.[23] While the supporting study (Document 4) does include a table which apparently purports to list the reactive emissions of each Harris County refinery, there is no explanatory or source material provided.[24]

As with chemical plants, the Texas reactive hydrocarbon inventory for refineries is not only supported by the sketchiest and most conclusory of data, but it yields results quite different from those anticipated by the EPA on the basis of its knowledge of similar sources in other states. Whereas the EPA calculates that all refineries in Region 7 emit 17,000 tons per year of reactive hydrocarbons (12 per cent of total hydrocarbon emissions of 142,000 tons),[25] the state apparently claimed some 131,000 tons for Harris County refineries alone.

[9] We conclude that the EPA was not arbitrary or capricious when it rejected Texas' calculations for refinery

23. The questionnaire used in the Radian Report did request that companies specify each specie of hydrocarbon emitted. However, none of the material in the Report, at least as it appears in the record, reflects the responses to this portion of the questionnaire.

24. Further, we can perceive no consistent correlation between the plant-by-plant total hydrocarbon data in the Radian Report and the supporting study's listing of reactive hydrocarbon emissions for each Harris County refinery—of the five instances in which a particular refinery appears on each list, in two the study's reactive inventory is slightly larger than Radian's total inventory, and in one it is much larger; in the other two, the Radian inventory is somewhat greater.

25. The source of the EPA's figure of 12 percent is discussed below. See p. 308.

emissions. This is not to say that Texas' very high figure is incorrect. Rather, our decision turns on Texas' failure to provide persuasive support for data which was inconsistent with results in other areas.

Given our disposition of the chemical processing and refinery categories, which are the principal sources of disagreement between the state and the EPA as to reactive hydrocarbon inventories, we think it unnecessary to consider other, minor, EPA objections to Texas' data. We turn now to the issue whether the EPA, having reasonably rejected Texas' inventory calculations, was arbitrary or capricious in its own calculations of the inventories on which it based the promulgated regulations.

B.

Since no studies have inventoried the actual reactive content of specific emission sources in Texas,[26] the EPA determined the reactive component by applying a "reactivity factor" to total hydrocarbons. The reactivity factor is a number, running from 0 to 1.0, which indicates the degree of reactivity of a source's hydrocarbon emissions. As shown in Table 2, the factors vary widely, both between different types of emission sources and between the EPA's and state's estimates for identical sources. In obtaining its reactivity factors, the EPA looked to "the relationship between reactive and non-reactive components for identical processes and sources in other areas of the country." 38 Fed.Reg. 30634 (Nov. 6, 1973).

26. This disregards the state's claim that it has performed such a study. As already discussed, it was not arbitrary and capricious for the EPA to reject this data, given the nature and sparseness of supporting material.

TABLE 2

	EPA	TEXAS
Area Sources		
(dry cleaning, degreasing, painting, etc.)	.2	1.0
Point Sources		
Chemical processing	.6	.86*
Petroleum refining	.12	**
Ship and barge loading	.4	.8 ***
Other	.6	
Transportation Sources		
Gasoline exhaust	.75	.8
Diesel exhaust	.45	.8
Aircraft	.38	.8
Gasoline evaporation	.65	.4
Railroads	.45	.8
Vessels	.8	.8
Off-highway	.45	.8

* According to EPA. But *see* note 21, *supra*. As discussed above, the state claims to have used a source-by-source inventory method rather than the EPA's method of applying a reactivity factor to total hydrocarbons.

** Neither stated by Texas nor calculated by the EPA. As discussed above, the state claims to have used a source-by-source inventory method rather than the EPA's method of applying a reactivity factor to total hydrocarbons.

*** According to EPA, but not stated as such by Texas.

Before this court petitioners claim that the agency was arbitrary and capricious in its methods of constructing hydrocarbon inventories. Principally, this claim arises from the contention that the EPA displaced the state's source-by-source study of the very emission sources to be controlled, and substituted data based on general reactiv-

ity factors derived in other parts of the country and applicable only to broad categories of emission sources; petitioners further contend that not only did the EPA use improper reactivity factors, but it also applied them to inventories which had already been reduced to eliminate many nonreactive hydrocarbons. The initial portion of this contention is nothing more than the claim that the state's reactive inventories should have been accepted, an issue just dealt with and which need not be discussed further. The second portion questions the validity of the EPA's reactivity factors and the appropriateness of the inventories to which the factors were applied, and must now be considered. From the briefs it appears that petitioners genuinely challenge only the resulting inventories for chemical processing and petroleum refining.

1. The Chemical Processing Reactive Inventory

As indicated in Table 2, the EPA applied a reactivity factor of 0.6 to chemical processing emissions. This figure was derived from empirical studies of chemical industries in Los Angeles and Louisiana, studies which yielded factors

[306]

of .52 and .47 respectively.[27] The EPA used a 20 per

27. We have inspected these studies to determine that they deal with broadly similar industries. However, we have not inquired into their validity or into how closely matched are the profiles of emissions from the studied industries and those in Texas. While these latter inquiries may be relevant to the reliability of the EPA's calculations, they are not necessary to our determination of whether it has acted arbitrarily and capriciously. These are complex matters which are beyond our ken absent the assistance of the parties. Petitioners have objected only in general terms to the EPA's use of these studies, and the agency has responded appropriately and adequately.

cent higher figure, which in this context benefits Texas, to give the state "every benefit of the doubt" and to account for having eliminated two minor sources of methane from its Region 7 total hydrocarbon inventory. *See* note 30 *infra.*

[10] Petitioners' only specific criticism of the 0.6 figure is that because the emissions from individual chemical plants vary considerably in reactivity, "it is unjustified to characterize an entire industry by a single reactivity factor."[28] Even granting that the reactivity factor for particular plants may be quite different from 0.6, we think it not unreasonable for the EPA to adopt that figure on an industry-wide basis. The figure 0.6 represents an average, and accounts for the fact that the individual figures which go into that average may be higher or lower. So long as 0.6 is applied to the sum of total hydrocarbon emissions from a representative array of chemical plants, its use is proper. Noting that petitioners present no empirical or theoretical material which suggests that typical emissions from the Texas chemical industry are substantially more reactive than those in Los Angeles and Louisiana, we conclude that the agency's use of 0.6 was not arbitrary or capricious.

However, this determination alone does not settle the propriety of the EPA's final reactive inventory for chemical processing. Under the agency's methodology reactive inventories are derived by applying the reactivity factor to an initial hydrocarbon inventory which should include the nonreactive hydrocarbons sought to be excluded by use of the factor. Petitioners urge that the EPA has ap-

28. Statement presented by the Texas Air Control Board, during public hearings on the EPA's proposed regulations, at 10.

plied its reactivity factor to an inappropriate initial inventory; specifically, they contend that a factor designed for use with total hydrocarbon inventories was applied to an inventory that had already been reduced by the most significant nonreactive hydrocarbons. At stake here is a very large portion of the difference between the EPA's Region 7 stationary source reactive inventory of 294,000 tons/year and the state's inventory of 481,000 tons/year —by applying the .6 factor to its Region 7 chemical processing initial inventory (429,000 tons/year), the EPA eliminated 172,000 tons/year from an inventory petitioners claim is wholly reactive.

[11] To resolve this conflict we have as a result of a post-argument conference obtained from the agency a step-by-step explanation of the method by which it developed its initial chemical processing inventory. This explanation was complete with the actual numbers used at each step, and enabled this court to trace back to the origins of the final result. In this way we have determined that the agency's initial inventory of 429,000 tons/year was not, as the state claims, based on reduced, reactive emission data. The EPA inventory is basically the sum of total hydrocarbon emissions from each Region 7 chemical plant, adjusted to reflect growth since the original data was assembled.[29] This to-

29. As stated in note 30, a relatively minor reduction was made for two obvious methane sources. The effect of this was accounted for with the use of a 0.6 reactivity factor, rather than .52 or .47.

The post-argument reconstruction of the calculation process yielded a figure 4,900 tons/year higher than that relied on by the agency. Use of the revised calculations would result in a 2,900 tons/year higher stationary sources reactive inventory and about 0.1 per cent lower reduction requirements. Although small, the effect of the error could not ordinarily be disregarded since the EPA seeks to impose control requirements contributing only 0.1 per cent reductions. How-

[307]

tal hydrocarbon data was not reduced on the basis of 'Texas' own reactive inventories for Harris County plants (submitted with the Texas plan), despite EPA statements which quite understandably led petitioners to believe this had been done.[30] In short, the agency applied its 0.6

ever, we will not in this instance require agency reconsideration so long as this error is completely offset by another error uncovered during the reconstruction, this one significantly benefiting petitioners.

A 36,500 ton/year refinery source was treated as a chemical plant, apparently as a result of carelessness on the part of both the agency and the state. Because the chemical plant reactivity factor was .6, while that for refineries was .12, the error added about 17,500 tons/year to the agency's Region 7 stationary source reactive inventory.

30. The agency's principal original explanatory document contains the following statement: "The Harris County emissions were updated to reflect the results of a source by source review of petroleum refineries and chemical plants within the county which reduced the inventory for the obvious sources of methane like hydrocarbons, benzene, acetylene and methyl alcohol." *Photochemical Oxidant Control Strategy for Texas* (Document 30), part II, p. 2-2 (Record page 3407). Further contributing to the conclusion that the EPA's initial Region 7 inventory was reduced by the most important non-reactive hydrocarbons, at least for Harris County sources, is Document 30's explanation of why a 0.6 reactivity factor was chosen rather than the .52 or .47 figures developed in the Los Angeles and Louisiana studies. "A reactivity factor of 0.6 was used in this study, since the Texas inventory was adjusted to eliminate obvious methane sources." *Id.*, at 2-4 (Record page 3409).

At the June 12 conference this court received a memo from Jack Divita, Chief of the EPA's Air Program Branch. The memo purports to describe the derivation of EPA's initial chemical processing inventory, and states:

> "To ensure completeness this [total hydrocarbon inventory] was compared with the Harris County inventory based on a source-by-source review prepared by the State (Document 4). This inventory was used for purposes of comparison only. The technical support document . . . should not be interpreted to mean that the Harris County inventory included in Document No. 4 was used as the data base by EPA.
>
> "EPA used a reactivity factor of 0.6 for chemical processing. This factor was chosen to give the State every benefit of the doubt. . . . The number of 0.6 was not chosen to account for a non-methane data base."

reactivity factor to an appropriate

Subsequently, at the request of this court and pursuant to an understanding amongst the parties, another Divita memo was submitted, this one backed up with worksheets and the computer printout used as the principal source for EPA calculations. The second memo and its supportive material confirm that the agency inventory is essentially total hydrocarbons, although it does modify the first memo in several ways. For one, the agency in fact did use, in place of the printout data, some entries from the source-by-source review in Document 4. However, the entries used were reasonably thought to be *total* hydrocarbon figures, by virtue of comparisons with the printout's 1970 data; indeed, the net effect of using this data was to *increase* the agency's chemical processing inventory. Second, in the instance of two carbon black plants total hydrocarbon data was eliminated because it was known to be methane. These reductions, which amount to only 11,000 tons, are offered in the second memo as the explanation for the statement in Document 30 that a 0.6 reactivity factor was used because the inventory "was adjusted to eliminate obvious methane sources."

Since our review is for the purpose of determining whether an agency determination is arbitrary or capricious, we are constrained to consider the EPA's post hoc statements. After all, they are not the post hoc *rationalizations* of agency actions which "have traditionally been found to be an inadequate basis for review." Citizens to Preserve Overton Park v. Volpe, 1971, 401 U.S. 402, 419, 91 S.Ct. 814, 825, 28 L.Ed.2d 136, 155. Rather, they are statements which establish what the agency did, not why it did it. Were we to disregard them, we would be reviewing not the agency's actual action, but rather a different action (further reduction of a reactive hydrocarbon inventory) that it in fact never took. While we are very concerned that both petitioners and this court have been temporarily misled and confused by the agency's original language, we cannot be diverted from our responsibility to review that which the agency actually did.

We have of course satisfied ourselves that the impression created by the earlier version is incorrect. Presumably the misleading wording resulted from carelessness, or poor communication between the EPA and the contractor responsible for Document 30. We accept the memos' version because their description is backed up by the actual calculations and worksheets required to derive the EPA's inventory from computerized listings of total hydrocarbon emissions for each Region 7 chemical plant. We have thus been able to determine for ourselves that in formulating its inventory the EPA made no significant reduction to account for nonreactive hydrocarbons.

[308]

hydrocarbon inventory. Its use of the resulting reactive inventory was not arbitrary or capricious.[31]

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31. As is apparent from the foregoing text and footnotes, this court has gone to considerable length to determine exactly what the agency did do. We have permitted the agency rather freely to supplement its original technical documents, not to provide additional justifications but in order to prove it used the techniques it claims to have used. In doing so we have recognized that some of petitioners' attacks were not presented to the agency (largely because its support documents were made available only after the regulations were promulgated). Further, we recognized that neither the parties to this litigation nor this court have had the experience to know in advance what is required to resolve in court the merits of implementation plan disputes.

We now have that experience, and it will affect our considerations should future litigants raise an issue not raised by the parties here, that of whether the agency's rule-making is arbitrary and capricious solely because it states its calculations and procedures in the summary fashion of Documents 30 and 31. The controversy over the content of the chemical processing inventory has required scores of hours of this court's time, and could have justified the services of a special master. It has also surely required hundreds of hours from lawyers and technicians on each side. Yet it could have been easily resolved at the outset, or would never have arisen, had the agency originally placed in the record the eight-page memo and four pages of worksheets, plus the printout, which show each step, and each assumption, in the process of compiling a regionwide inventory from plant-by-plant data. Further, the availability of this material is important if the agency and states are to be able to understand how and why their calculations yield different results, so that their differences can be resolved by technical personnel rather than the courts. In addition, worksheet materials would enlist the state's technical expertise in protecting against wasteful errors.

We are satisfied that such information is vital in these cases, and can be feasibly provided. It is largely for failure to provide similar information that we have accepted the agency's rejection of the state's plan. The result in dealing with the agency's calculations has been different because its determinations are protected by the arbitrary and capricious standard. However, we are uncertain whether that protection will be so effective in future cases.

2. *The Petroleum Refining Reactive Inventory*

[12] As in the case of chemical processing the EPA derived its refining reactive inventory by applying a reactivity factor to an original, presumably total, hydrocarbon inventory. However, we need only deal with the first element of this procedure to determine that the agency must reconsider this portion of its Texas calculations, for we have concluded that the agency's choice of reactivity factors was arbitrary and capricious.[32]

In choosing its factor the EPA again looked to Louisiana and Los Angeles data. The factors for these areas were .18 and .12 respectively, and the EPA chose .12 for Texas. The agency has not explained why the lower figure was chosen and no "benefit of the doubt" was given.

The record reveals that at least the following objections to the .12 factor were made before the agency: (1) that the Los Angeles study was outdated, being based on 1955-58 data and preceding both significant changes in refinery

[309]

technology and considerable additional emissions inventory research; (2) that Texas refineries have a product mix different from those on the west coast, and are more

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32. Petitioner Harris County suggests in its brief that the inventory to which the refinery reactivity factor was applied had already been reduced to eliminate at least some non-reactive hydrocarbons. As we did with the EPA's chemical processing inventories, we have obtained memoranda from Mr. Jack Divita, Chief of the EPA's Air Program Branch, outlining the steps taken by the agency in deriving the figure it used as the Region 7 initial refinery inventory. If this information has not satisfied petitioners' doubts, they should raise the matter before the agency during its reconsideration of its choice of reactivity factor.

heavily oriented toward highly reactive substances; (3) the bulk of Texas refinery emissions are gasoline vapors from tank farms, and thus the .12 factor is inconsistent with the .65 factor used by the EPA for gasoline emissions from other sources.

The only EPA response to any of these criticisms is directed to the third point. The agency denies that there is any inconsistency by explaining that Texas refinery emissions include little gasoline, and that most are low-reactivity emissions from refinery feed stock and products other than gasoline. According to the EPA, the low gasoline content is due to the fact that in Texas gasoline evaporation is already kept at a minimum by the use of storage tanks with floating roofs which raise or lower to accommodate the expansion or contraction of gasoline vapors.

We believe that the state's objections deserve more consideration, and their rejection more explication, than has been accorded by the EPA. We are strengthened in this view by several further points. First, the state submitted data raising the possibility that the EPA's reactive refinery emission inventories were grossly low. For one thing, although the state generally did not break its inventories down by source category,[33] it did supply what apparently purported to be a reactive refinery inventory for Harris County.[34] As has already been noted in this opinion, that figure was 131,000 tons/year, compared to the EPA's reactive inventory of 17,000 tons/year for *all* of Region 7 (Region 7 contains three refineries located outside of Harris County). While the state's inventory was not bolstered by sufficient data or explanation to require agency acceptance for all purposes, *see* pages 303-304, *supra,* the magnitude of the difference should have alerted the EPA to the possibility that the state's objections to .12 were well-founded. The same alert should have resulted from Texas data showing that one Region 7 refinery had a reactivity factor of .26—[35] given that there are only ten refineries in Region 7, the large difference between the one refinery's factor and the EPA's presumed average factor required consideration and explanation.

Our consideration of whether the agency has been arbitrary and capricious in developing its refinery reactive inventories is affected by a background factor. This factor is the significance of those inventories to the agency's calculations and resulting control requirements. Our analysis indicates that the principal difference between the agency's and the state's Region 7 stationary source inventories arises right here. That difference is 187,000 tons/year (481,000-294,000). Data submitted with the state's plan shows that the difference between EPA's Region 7 reactive inventory (17,000 tons/year) and the apparent state Harris County reactive refinery inventory (131,000 tons/year) accounts for 114,000 tons/year; presumably a significant additional portion is accounted for by emissions from the Region 7 refineries which are not in Harris County and thus do not contribute to the state's 131,000 figure.[36]

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33. But see the discussion of Document 14 in note 19 *supra.*

34. It is unclear whether this inventory represents 1970 raw data or the state's final adjusted 1972 data. See note 20 *supra.*

35. *Statement presented by the Texas Air Control Board on Transportation Controls Proposed for Texas* at 10 (Aug. 15, 1973).

36. Document 14, discussed above in note 19, indicates that the state apparently claimed a region-wide total of 173,000 tons/year. As with the Harris County inventory, it is not clear whether this figure is 1970 raw data or the state's final adjusted 1972 data. *See* note 20 *supra.*

Further indication of the importance of the EPA's choice of petroleum refining reactivity factor is the effect a different factor would have on the additional controls required in Region 7. According to our own calculations,[37] the

[310]

use of .18 would eliminate the need for most, and .26 for all, of the transportation controls; the use of .65 would relieve Region 7 of both the land-use and transportation controls.[38]

37. *See* note 39, *infra.*

38. The following chart lists the additional controls required for Region 7 by the EPA regulations, along with their corresponding 1977 percentage reductions in reactive hydrocarbon emissions.

40 C.F.R.	Subject Matter	1977 Reduction
52.2284	Degreasing operations	0.6%
52.2285	Vapor recovery during gasoline delivery to storage tanks	1.5
52.2287	Vapor recovery during ship and barge loading	2.7
52.2288	Vapor recovery during automobile refueling	1.3
52.2290	Vehicle inspection and maintenance	0.8
52.2291	Retrofit of pre-1968 automobiles	0.8
52.2292	Restriction on new or modified emission sources	1.2
52.2293	Gasoline rationing	0.1
52.2294	Bus/carpool lanes	0.1
52.2295	Parking supply management	0.1
52.2296	Bus/carpool matching and promotion	0.1
52.2297	Employer-supplied incentives for use of mass transit	0.1
		9.5*

* Actual total of listed figures differs, due to effect of rounding.

Regulations 52.2284-52.2291 are emission source controls, regulation 52.2292 is a land-use control, and the balance are transportation controls. The latter should be distinguished from "transportation-related controls," a descriptive term which includes such vehicular emission source regulations as 52.2285 and 52.2288-52.2291. "Transportation controls" is a statutory term referring to measures which reduce emissions by reducing vehicular travel rather than by reducing the emissions which result from each vehicle mile traveled. *See* 42 U.S.C.A. § 1857c-5(a)(2)(B).

[13] In these circumstances it was arbitrary and capricious for the EPA to disregard Texas' objections to its refinery reactivity factor. Those objections must be considered and answered before regulations based upon that factor may go into effect. We now turn to the question of exactly which regulations are so based. In making these determinations we have calculated the effect in each region, in terms of reduced need for additional control measures, of higher refinery reactivity factors. Our computation method is discussed in the margin.[39]

39. Our calculations were based on the total refining emissions inventory for the baseline year in each region, as shown in Tables 6-1 through 6-6 of Document 30, Part II. In each instance, the appropriate entry was multiplied by .65, yielding a revised refinery reactive inventory. The figure .65 was chosen as the hypothetical refinery reactivity factor in order to test the effect of agency reconsideration against the very highest factor that has some basis in the record before us. We in no sense are suggesting that .65 is the correct factor, nor are we establishing a presumption that the EPA should adopt such a factor. Rather, we use this figure simply to accord petitioners complete interim protection against the possibility of being required to comply with regulations which eventually prove unnecessary.

In each region the revised reactive refinery inventory was *substituted* for the original EPA inventory (based on .12 and shown in the baseline year "Reactive" column of the above-referenced tables), resulting in an increased baseline inventory in each region. For this purpose, the initial baseline inventories were those shown in Tables 7-2, 8-2, 9-2, and 10-2 of Document 30, Part I. (These are identical to baseline year reactive "Grand Total" entries in Tables 6-3 through 6-6, when the addition errors in these latter tables are corrected.) The *revised* baseline inventories were divided into the tons/year reductions expected from each EPA control measure, as listed in

[311]

Region 3 (Austin-Waco)

Since the Region 3 reactive hydrocarbon emission inventory contains no refinery emissions, no regulations in this region are affected by the .12 factor.

Region 7 (Houston-Galveston)

We calculate that a .65 reactivity factor would increase the effectiveness of Texas' plan by 2.4 per cent, so measures resulting in at least this great a reduction must be held in abeyance pending agency reconsideration.[40] Since

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Tables 7-2 through 10-2. The result was smaller percentage reductions for each measure (except where the change was so minor as to fall within the rounding off to tenths of percent); this effect of a higher baseline inventory is reflected in notes 40 and 41.

To determine the effect of a .65 factor on reductions obtained by Texas' own plan, the revised reactive refinery inventories were multiplied by .9, reflecting the 90 per cent effectiveness of Texas' plan on refinery emissions. This revised reduction (in terms of tons/year) was *substituted* in Tables 7-2 through 11-2 for the EPA's original reduction estimates based on a .12 factor (these were determined by taking 90 per cent of the baseline year reactive refinery emissions shown in Tables 6-3 through 6-6). The result was a higher reduction, in terms of tons/year, for the "Present Controls" entries in Tables 7-2 through 10-2. Dividing these figures by the *revised* baseline inventories produced the percentage reduction expected from the Texas plan in each region. These figures were of course greater than those shown in Tables 7-2 through 10-2.

The lessened need for additional controls is measured by the extent to which each region's target is exceeded by the sum of the revised percentage reductions for each measure.

40. For this purpose we calculate that each regulation contributes the reduction shown in the following table. These percentages are derived by dividing the tonnage reduction expected from each regulation by a baseline reactive emission inventory of 476,000 tons/year. The latter figure reflects the 75,400 tons/year increase created by assuming 65 per cent of Region 7 refinery emissions to be reactive.

land-use and transportation controls are to be employed only when "necessary," 42 U.S.C.A. § 1857c-5(a)(2)(B), and not in place of available direct emission source limitations, Natural Resources Defense Council, Inc. v. EPA, 5 Cir., 1974, 489 F.2d 390, 406-409, regulations 52.2292 through 52.2297 must supply the first 1.5 per cent. The remaining 0.9 per cent may be supplied, for the time being, by regulation 52.2288 (vapor recovery during vehicle fueling), because we are in any case requiring the agency to reconsider that regulation. *See* pages 315-316 *infra*. However, the choice of measures to defer is ultimately for the agency. Should it complete its reconsideration of 52.2288 prior to reconsideration of the reactivity factor, and should it wish to repromulgate that regulation, it may select for deferral other regulations contributing reductions of at least 0.9 per cent.

Region 8 (Dallas-Fort Worth)

Refinery emissions are a small part of total hydrocarbon emissions in this region, and we calculate that even a .65 factor would improve 1977 performance of Texas' plan by only 0.4 per cent. This figure is well under the reduction to be obtained by the least effective of the EPA's additional controls. We therefore think it unnecessary to defer any agency regulations pending final dis-

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52.2284	0.5
52.2285	1.3
52.2287	2.3
52.2288	1.1
52.2290-52.2291	1.3
52.2292	1.0
52.2293-52.2297	0.5

[312]

position of the reactivity factor controversy. In light of the small figure involved, and of the liberality of a .65 reactivity factor, and in light of our disposition, *infra*, of the gasoline marketing regulations in this region, it is more appropriate for any effect of a larger factor to be accounted for in Texas-initiated agency proceedings to modify the implementation plan which we herein approve. *See* 42 U.S.C.A. § 1857c-5(a)(3).

Region 9 (San Antonio)

Calculations based on a .65 reactivity factor increase the Texas plan's 1977 reductions by 2.6 per cent. The EPA's transportation regulations (52.2293-94, 52.2296-97) are designed to obtain a 4.1 per cent reduction.[41] We thus defer the effective date of these controls pending agency reconsideration. The remaining regulations, all of which deal with direct emission sources, need not be deferred.

Region 11 (El Paso)

A .65 refinery reactivity factor would yield additional reductions from the Texas plan of 6.3 per cent. Transportation controls in the EPA's regulations produce a 3.0 per cent reduction,[41] and must be deferred. The EPA plan achieves the balance of the requisite 34 per cent reduction by requiring vapor recovery in gasoline marketing operations (regulations 52.2286, 52.2288). Since a substantial potential for lowered additional requirements

41. This figure reflects the fact that use of a .65 refinery reactivity factor increases a region's baseline reactive hydrocarbon inventory.

exists in this region even after elimination of transportation controls, we believe that the gasoline marketing regulations should also be deferred. In addition, deferral is appropriate for a second reason, that of reconsideration of regulations 52.2286 and 52.2288 in light of the discussion on pages 314-315 and 318, *infra*.

IV. *SPECIFIC REGULATIONS*

Our disposition of the refinery reactivity controversy pretermits many but not all of the specific challenges to particular EPA regulations. We will now address the remaining issues of this nature on a region-by-region basis.

To the extent required by the factual setting and the contentions of petitioners, we will consider two matters for each regulation. The first is whether the agency's promulgation of a particular regulation exceeds its authority. The second is whether the effective date of a particular regulation should have been postponed until May 31, 1977, in accordance with the state's request for the two-year extension authorized by 42 U.S.C.A. § 1857c-5(e).

While subsection (e) does not compromise the Clean Air Act's absolute command that the national ambient air standards be met by 1977, it does provide some flexibility for the period between 1975 and 1977. As we read the subsection it recognizes that technological advances by 1977 might render unnecessary, as of that date, onerous control measures which are needed to meet the standards by 1975. Subsection (e) provides a mechanism for subjecting such measures to a reasonableness test. This serves, in our opinion, to protect the public against wastefully heavy expenditures on control measures which by 1977 would be outdated and unnecessary.

To obtain an extension a state must submit an implementation plan theoretically meeting the 1975 target, but relying on control of emission sources which in fact are unable to comply because "the necessary technology or other alternatives are not available" until a later date.

[14, 15] Further, the state must consider and apply in its plan "reasonably available alternative means" of attaining the standard by 1975. Before granting the extension, the EPA Administrator must determine that the state's plan satisfies the foregoing requirements, and that it applies by 1975 all control measures included in it for which the technology is available. He must also deter-

[313]

mine that the plan employs all interim measures that are "reasonable under the circumstances" for control of those sources whose inability to meet the 1975 target is the basis of the extension. The net effect of these provisions is that the agency may not force[42] a state to adopt measures needed during the 1975-1977 period merely because they are available, but only if they also are reasonable.

In the case before us, the state submitted a plan which would, according to its calculations, attain the standards by 1975, but which placed "significant emphasis on the reductions to be achieved from Federal controls on motor vehicles." Letter from the Governor of Texas, dated April 13, 1973, and accompanying the state's plan. Recognizing that the impact of these controls would increase

42. While measures determined to be unreasonable may not be forced upon a state, apparently nothing precludes their voluntary adoption—as might happen if a state preferred such a measure to one validly determined to be reasonable.

through 1977, *see* note (6) *supra*, the governor requested an extension "in order to take the maximum advantage of the Federal controls on automobiles."

The EPA concedes that its automotive emissions standards will result in significantly higher reductions from auto sources by 1977, and that certain of its additional requirements for Texas are needed only if the standard must be met by 1975. We therefore think that the only issue before us with regard to Texas' extension application is whether these "interim"[43] control measures are "reasonably available."[44] As discussed

43. Our use of the term "interim" is somewhat different from that in paragraph (2)(B) of subsection (e). As it appears in this opinion it refers not merely to measures for the temporary control of those sources for which more effective technology should be available by 1977. It also refers to those measures of permanent effect which are initially required only to meet the standard before 1977. The principal example of such an "interim," albeit permanent, measure is the requirement for vapor recovery during gasoline marketing operations. To recover these vapors for a one or two-year period requires a capital investment in equipment that will be available for many years thereafter.

44. It could be argued that we are ignoring a technical requirement of subsection (e) by going straight to the merits of the decision to deny an extension. While the agency does not raise this argument, we think we should briefly address it in light of Natural Resources Defense Council, Inc. v. EPA, 1973, 154 U.S. App. D.C. 384, 475 F.2d 968. The statute requires that a state submit a plan implementing the national ambient air standard by 1975. When submitting such a plan the state may seek an extension for the reasons stated in the text. As discussed in Parts I & II of this opinion, in this case the agency determined, validly, that the state plan did not implement the national standard.

Nonetheless, we will not rule that Texas is ineligible for an extension until it submits another plan which in fact implements the standard.

In the first place, the statute is inherently ambiguous, by virtue of its failure to specify whether the plan with which the extension application is submitted must receive EPA approval prior to consideration of the extension. That it would be inappropriate to require

[314]

in Part I of this opinion, we must approach this question in terms of whether it was arbitrary or capricious for the agency to determine that its interim measures were reasonable.

Region 3 (Austin-Waco)

The required reduction in reactive hydrocarbons for this region is 27 per cent. The EPA calculates that the

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such approval as an absolute rule is suggested by the fact that even an approved implementation plan as contemplated in subsection (e) provides only for theoretical attainment of the standard, not attainment in fact. Second, to require another submittal from Texas would be pointless, for Texas' original plan, its request for an extension, and its brief all make it abundantly clear that in meeting the standard Texas wishes to rely as heavily as it can on the effects of federal control of automotive emissions. Further, since the state's strategy has long been clear, persons who object to this approach have had ample opportunity to comment and to have whatever impact they would be likely to have if the state implementation process were repeated. Finally, our failure now to address the merits of this issue could produce either further delay before the final adoption of a plan, or the use of techniques which are contrary to the statutory concern, expressed in subsection (e), that interim measures be forcibly employed only if reasonable.

We also decline to order resubmittal on the basis of a second potential technical objection, that Texas apparently did not submit a plan imposing or relying on motor vehicle requirements which would not be met by 1975. *See* 42 U.S.C.A. § 1857c-5(e)(1)(A). Rather, Texas appears to have calculated the additional reductions required as of 1977 based on projected independent reductions in motor vehicle emissions. We think this sufficient, both for the reasons stated in the preceding paragraph, and also because vehicle emissions control *is* being accomplished independently of Texas' plan, such that its effect is more appropriately treated as a background factor than an integral part of that plan. While subsection (e) is principally aimed at cushioning states against unreasonable measures when the controls they impose cannot be fully effective until after 1975, we think it properly applicable to the kindred situation presented here—that in which the post-1975 reductions are accomplished by control measures or other factors independent of the state's own plan.

Texas strategy would achieve a 19.4 per cent reduction by 1975. In order to reach 27 per cent the agency has required that Texas Regulation V be extended to additional counties (for a reduction of 3.8 per cent), and that vapor recovery systems be installed to eliminate emissions when transferring gasoline from tank trucks to service station storage tanks (also contributing 3.8 per cent).

The EPA calculates that the Texas strategy alone would achieve the 27 per cent reduction by early 1976, and that by 1977 it would produce a 30.3 per cent reduction. An agency chart indicates that further reductions would be accomplished in each succeeding year through at least the early 1980's. It is thus clear that the agency's requirements are interim measures which must be subjected to the test of reasonableness.

In considering this issue we think the starting point must not be simply whether an interim measure is physically available. Rather, it must be cost of each regulation. Otherwise, we cannot understand the statutory distinction between longterm measures, which must be applied before 1977 if "available," and interim measures which must be applied only if "reasonably available." *See* 42 U.S.C.A. § 1857c-5(e)(1). *Cf.* Natural Resources Defense Council, Inc. v. EPA, *supra*, which mandates that economic cost or technical feasibility are always to be subordinate to considerations of public health under the Act, 489 F.2d at 411, but which does not involve the precise issue of interim measures being "reasonably available" under § 1857c-5(e)(1).

[16] Document 30 informs us that the total cost of vapor recovery in Region 3 would be approximately 3 million dollars (at the $2,000 per station figure given in

the commentary to the final promulgation, 38 Fed.Reg. 30637 (Nov. 6, 1973), the cost is close to $5,000,000). Document 30 also states that the extension of Regulation V would "involve a significant addition to capital expenditures by the affected industries." The agency has considered these costs, and believes them reasonable as compared with costs of physically available alternatives, in terms of emissions reductions obtained per dollar expended. However, we do not think that awareness of total cost and selection of relatively cost-effective measures are sufficient for determining that an interim measure is reasonable. We think that that decision must also involve attention to the fact that the reductions obtained by these expenditures are needed only for a short period of time. The EPA balanced the cost of its regulations against reductions to be obtained throughout the life of a control device. However, it is more appropriate in this circumstance to consider cost in terms of the period of time during which the reductions provided are needed to meet the national standard.

[315]

[17, 18] Viewed in this framework we think it impossible to conclude that the EPA's additional regulations for Region 3 are reasonable, and we conclude that the agency was arbitrary and capricious to deny an extension because of the physical availability of these measures. In reaching this conclusion we are moved not only by the requirement of a substantial investment for a speedup of less than one year in attaining the standards, but by several other factors as well. For one, we take judicial notice of the facts that this is a period in which investment cap-

ital is scarce and inflationary pressures are severe. In addition, not only are we currently experiencing a variety of raw material shortages, but the particular control devices necessary to comply with the vapor recovery regulations are themselves in short supply—indeed, other Texas regions have for this reason been granted an extension until 1976 for implementing vapor recovery.[45]

Our decision does not relieve the agency of the determination required by paragraph (2)(B) of subsection (e). This paragraph specifies that when an extension is granted because adequate control of a particular source is not available by 1975, that source must be subjected to "such interim measures of control . . . as the Administrator determines to be reasonable under the circumstances." Here the particular source is motor vehicles. Should the Administrator determine that vehicle controls are reasonable during the post-1975 interim created by the extension, he must promulgate regulations implementing them. The determination of reasonableness should involve consideration of the factors identified above, relating not only to total cost but also to the period of time over which necessary reductions would result from a given expenditure.

Region 7 (Houston-Galveston)

As set forth above, we are deferring the effectiveness of transportation and land-use controls incorporated in EPA's promulgated regulations. We thus need not consider various challenges to them. It is also the case that EPA has granted the two-year extension sought by Texas for Region 7. Therefore, we need only concern ourselves with

45. 38 Fed. Reg. 30635, 30638, 30640 (Nov. 6, 1973).

the emission source regulations which are challenged by petitioners, these being those which require vapor recovery during ship and barge loading and during the filling of vehicle gasoline tanks. Since both of these regulations could go into effect immediately, or at least prior to completion by the agency of its reconsideration of the refinery reactivity factor, *see* page 311 *supra,* we will address ourselves to the issues raised.

The automobile refueling vapor recovery regulation requires, for Region 7, 90 per cent recovery of hydrocarbon vapors. While the regulation itself does not specify, the agency has stated that this goal must be attained for each and every vehicle filled (save for certain types of vehicles which are not compatible with standard control equipment). "Response to Comments," April 1974, Document 427, p. 6. This latter requirement precludes reliance on techniques which could meet the 90 per cent goal on an average basis, but not for every vehicle. According to petitioners the effect is to require the use of more complex, expensive and hazardous equipment.

[19] The agency has not contested that its regulation will likely require the more complex techniques. It does contend that a complex system exists which (1) is virtually ready for on-line use, (2) is safe, and (3) is not excessively expensive. The record is such that the first two determinations are not arbitrary and capricious. However, the third cannot be sustained on the record and EPA explanations.

The agency's principal counter to petitioners' cost objections is the carbon adsorption system. It considers this system to be only somewhat more expensive than the simple, but less effective, dis-

[316]

placement system.[46] The agency's technical support document does bolster the proposition that initial capital outlay is not a great deal more ($5,065 versus $6,900 per station for existing stations). Document 30, Part II pp. 5-6 through 5-9. However, at page 5-9 we are told that the cost effectiveness for the simple system is $0.19 per lb. of vapor recovered and 0.14¢ per gal. of gas pumped. The carbon adsorption system compares rather poorly, at $0.34 per lb. of vapor recovered and 0.25¢ per gal. of gas pumped. Further, the more expensive system is expected to achieve only 3 per cent greater recovery than the displacement system (79 per cent versus 76 per cent in 1977, and 98 per cent versus 95 per cent in 1985). Based on this information Document 30 draws the following conclusion:

> "From these figures it is obvious that [simple displacement] represents the most efficient technique for motor vehicle vapor recovery. [Carbon adsorption and another complex system] offer additional recoveries but the *incremental* costs associated with these recoveries is very high."

The agency apparently ignored this conclusion, making no reference to it although imposing a regulation which requires a complex system. While such a system may be necessary, despite its high incremental cost, it has not been

46. Both systems are designed to capture vapors displaced from vehicle tanks during refilling. The displacement system simply forces these vapors into the service station tank, from which, theoretically, an equal volume of fuel has been removed. The more complex systems seek to also capture excess vapors created by temperature differentials between the storage and vehicle tanks.

justified in this rule-making. Further, the agency has also failed to explain why it is unwilling to accept compliance with the 90 per cent target on an average basis—where the average basis adequate, complex systems apparently would be unnecessary. Thus this regulation must be reconsidered; should the agency choose to repromulgate it without change, there must be satisfying explanations of why an average recovery of 90 per cent is unacceptable, and why some slightly lower target has not been adopted in order to avoid the "very high" incremental costs of complex systems.[47]

The other regulation which is specifically challenged pertains to the control of hydrocarbon emissions during the loading and unloading of ships and barges using port facilities within Region 7. Certain private petitioners assert that EPA lacks statutory authority with respect to ships and barges. Moreover, they assert, all jurisdiction over the safe operation of marine vessels is vested in the Coast Guard. *See* 46 U.S.C.A. § 391a.

They also contend that control technology is not available and will not be during the short time allotted for implementation of the requirement. Finally, they allege discrimination in that the Houston-Galveston area has been singled out among all American ports for these emission controls and their possible adverse effect on the use of ports in the region.

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47. We are told that regulations for vapor recovery during vehicle refueling are under agency review on a nationwide basis. However, the agency wished to stand on the record in this case, on the grounds that the information generating the review was not available when the Texas regulations were promulgated and thus should not affect the initial validity of those regulations.

[20] We have carefully considered the language and scheme of the statute as well as the legislative history. This requirement is a part of an implementation plan and such a plan under the Act must assure attainment of ambient standards by employing "emission limitations, . . . and . . . other measures . . . including but not limited to, land-use and transportation controls." 42 U.S.C.A. § 1857c-5(a)(2)(B). It is true that vessels were eliminated from the Senate bill by a conference committee, but the elimination occurred in a portion of the bill prescribing the establishment of nation-

[317]

al uniform standards for new automobiles, aircraft and vessels. *See* 1970 U.S. Code Cong. & Admin. News, pp. 5356, 5381. This subchapter, appearing in its final form at 42 U.S.C.A. §§ 1857f—1 to 1857f—12, must be distinguished, as a separate element of the overall attack on air pollution, from subchapter 1 which requires implementation of ambient air quality standards on a region-by-region basis. In particular, the § 1857f national standards concern only motive power and associated emissions, not the myriad of emissions which degrade ambient air quality in a particular region, such as those from the loading and unloading of vessels.

[21] Likewise, there is no merit in the suggestion of a lack of authority due the Coast Guard's responsibility for safety regulations. The commentary to the regulation in question recognizes the necessity of agency/Coast Guard cooperation in establishing emission controls for marine sources. 38 Fed.Reg. 30636 (Nov. 6, 1973). There is no indication that the EPA will attempt to invade

the domain of the Coast Guard or otherwise interfere with or jeopardize its provisions for maritime safety.

Only a short time was allowed by the EPA for implementing the required controls. The necessary technology is not presently available, although it is suggested by the technology used in controlling evaporative losses during the transfer of gasoline from tank trucks to service station tanks and thence to automobiles. There is no basis whatever in the record for concluding that a compliance date of May 31, 1975 is technologically feasible, and it may well be that this requirement must be postponed. However, we do not believe that this fact makes the regulation arbitrary or capricious, for 42 U.S.C.A. § 1857c-5(f) contemplates plans which require control measures of less than certain technological feasibility. That section specifies procedures for obtaining a postponement of compliance dates for particular sources, and it is through those procedures that petitioners must seek relief.

[22] The simple fact that the ship and barge regulation discriminates against Region 7 is irrelevant, for the statutory scheme clearly contemplates that heavily polluted areas will be subject to more burdensome implementation plans. Petitioners' argument does go farther, however, and objects that this discrimination will shut down Region 7's refinery industry. Assuming this objection is relevant, we think it premature. On the present record it was not arbitrary or capricious for the agency to conclude that the region's refineries will continue to attract required shipping resources, albeit at the somewhat higher price required to induce tanker owners to make the necessary adaptations. Should future events indicate that this conclusion is erroneous, or that vapor recovery is technologi-

cally impossible, and that Region 7 refineries are threatened with closure, the state may adopt a revision of its plan, under 42 U.S.C.A. § 1857c—5(a)(3). Agency approval of such a revision would of course require that other controls be substituted to assure attainment of the national ambient air standard.

In sum, we do not find the ship and barge regulation to be arbitrary and capricious on the present record.

Region 8 (Dallas-Fort Worth)

For this region a 34 per cent reduction in hydrocarbon emissions is required. According to the EPA's calculations, the Texas strategy would result in a 22.5 per cent reduction by 1975, a 27.7 per cent reduction by 1976 and 33.1 per cent by 1977. According to a chart in Document 30, the progressively more effective federal auto emission controls would by some time in late 1977 boost the reduction under the Texas strategy above 34 per cent, and reductions would continue into the early 1980's.

To make up the short fall, the EPA required extension of Regulation V to an additional county (resulting in a 1.8 per cent reduction), and vapor recovery during gasoline marketing operations (contributing 8.1 per cent). However, since

[318]

equipment for the vapor recovery regulations was not expected to be available for installation by 1975, the region was granted an extension until June 30, 1976.

Because applying Regulation V to an additional county, plus the Texas strategy, would together produce reduc-

tions exceeding the 34 per cent target by 1977, the gasoline marketing regulations would be completely unnecessary were the requested two-year extension granted. In considering whether it was arbitrary and capricious for the agency to deny the extension, we note that denial requires an expenditure in excess of $41,000,000, but that the period during which the benefit of this expenditure is needed is only eleven months (June 30, 1976 to May 31, 1977).

[23] For the reasons discussed when faced with this issue in Region 3, we conclude that the agency's determination was arbitrary and capricious. The extension should have been granted and Region 8 should not have been subjected to the gasoline marketing vapor recovery regulations. Whether interim vehicle controls should be imposed is a matter for the agency. *See* 42 U.S.C.A. § 1857c-5(e)(2)(B); p. 314-315 *supra*. The promulgated regulations do contain three interim transportation controls, based on an agency determination of reasonableness and required because of the 13-month extension it granted in this Region. Before these regulations can be effective the agency must reconsider their reasonableness in light of the standards discussed at pages 314-315.

[24] The remaining additional regulation for Region 8 is extension of Texas Regulation V to Tarrant County. Although it is expensive, and although its effect is needed only for a short period of time after May 31, 1977, the statute's command is absolute that all necessary measures be taken to attain the air standards by that date. Therefore, this court cannot disturb the agency's promulgation of the regulation.[48]

48. If Texas believes that the reductions to be obtained from extending Regulation V in its entirety to all of Tarrant County are not needed to meet the standard as of May 31, 1977, and that expenditures needed only to meet the standard prior to that date are not reasonable in light of this court's discussion of that subject, it may present its position to the agency through a 42 U.S.C.A. § 1857c-5(a)(3) revision proceeding.

Region 9 (San Antonio)

[25] The agency granted the state's request for a two-year extension in this region. Even at the end of that time, and for the foreseeable future, controls in addition to the Texas strategy will be necessary.

Since we concluded in Part III of this opinion that transportation controls for Region 9 must be deferred pending agency reconsideration of the refinery reactivity factor, we are concerned here only with source controls required in addition to the Texas strategy. These are control of degreasing operations, vapor, recovery in gasoline marketing operations, and an inspection and maintenance program for light duty vehicles. The only specific challenges which we have found amongst the myriad of petitioner's briefs are to the regulation requiring vapor recovery during vehicle fueling. This regulation affects Region 9 in exactly the same fashion as it does Region 7. For exactly the same reasons we gave when considering that region, we require similar agency reconsideration.

Region 11 (El Paso)

[26] By virtue of our disposition of the reactivity factor controversy, we deferred the only additional control measures required in this region. As indicated at page 312 *supra*, these regulations should also be reconsidered in light of our discussion of what constitutes a "reasonably available" control measure for the purposes of subsection (e). According to EPA calculations, the Texas strategy alone

would meet the reduction target by 1977. Further our disposition of the vehicle refueling regulation, in Regions 7 and 9, is applicable in this region.

[319]

V. OTHER ISSUES

There remains for consideration a miscellany of matters with which we may briefly deal.

Certain petitioners have submitted a motion to strike various portions of the record. In particular, their motion is directed at the agency's technical support Documents 30 and 31, which were compiled and made available only after the regulations were promulgated. If these documents contained new data which was not available when the agency made its determinations, the motion would have merit. However, these documents are statements of agency methodology and compilations of information which was in the record when the determinations were made. For this reason the motion to strike is hereby denied.

Petitioner Exxon has pressed arguments based upon three facts related to the agency's ozone measurement procedures: (1) that different techniques for measuring photo-chemical oxidant pollution yield, in certain circumstances, widely varying results; (2) that the standard of .08 ppm is not altered for areas which record high background levels of ozone; and (3) that reduction requirements are based on oxidant pollution levels which occur during air stagnation episodes. While the parties present arguments on the merits of these attacks, we need not reach them. Since the challenged procedures

comply with, and probably are mandated by, the published national standards, 40 C.F.R. § 50.9, petitioner's attack is basically directed at those standards. 42 U.S.C.A. § 1857h-5(b) makes it clear that ours is not the proper forum for review of such challenges.

Realizing the restrictions on raising objections to the national standards, petitioner Exxon has also incorporated its criticisms of the agency's measurement procedures into a somewhat more sophisticated and substantial argument that the agency has been arbitrary and capricious. The argument is that by virtue of the alleged deficiencies, as well as by virtue of the numerous uncertainties involved in determining the appropriate reduction curve and the reductions to be obtained by specific measures, the margin of error of the agency's calculations is so large that it was arbitrary and capricious to impose control measures which contribute only the relatively small reductions specified in note 38 *supra*. As we have indicated elsewhere in this opinion, we are well aware of the EPA's use of projections, assumptions, and flimsy data. However, we do not think that the margin of error inherent in the agency's calculations precludes its promulgating the regulations which remain in this case after our disposition of the other issues. Our reasons are several. For one, as we have already noted, the agency's use of uncertain data is necessary if it is to perform its statutory duty. In these circumstances we can only require that its data be the best that is feasibly available.[49]

A second reason for rejecting the margin of error argument is that margins of error cut both ways—the argu-

49. As we stated in note 16, this aspect of the agency's power imposes a correlative duty to reconsider and revise its requirements as better data becomes available.

ment provides just as much support for the proposition that the Region 7 target should be 85 per cent as it does for petitioner's proposition that the state's strategy would produce reductions so close to the target that any shortfall should be disregarded. Especially is this relevant when we recognize that at several key points in developing the promulgated regulations the agency accounted for the uncertain quality of its data by imposing less stringent requirements than the data might support. For example, the reactivity factor used for chemical processing emissions was .6 rather than .47 or .52, and the agency is satisfied with a 75 per cent target in Houston rather than the much higher target that is suggested by the nonmethane data on which Appendix J is based. *See* note 14, *supra*.

[320]

As a final note on the margin of error argument, we point out that our only concern with it is in the context of those control measures which are not deferred pending agency reconsideration of the refinery reactivity factor. That is, we deal with this issue only with regard to control of emissions sources and not as it relates to transportation and land-use controls. Thus we have had no occasion to consider the effect of a margin of error on controls which, after all, are unlike emission source controls in that they may be imposed only "as may be necessary." *See* 42 U.S.C.A. § 1857c-5(a)(2)(B); Natural Resources Defense Council, Inc. v. EPA, *supra*, 489 F.2d at 406-409. Similarly, we have not had occasion to consider the fact that the agency's reduction targets are apparently accurate only to the nearest whole percent,

whereas the reductions credited to each measure are calculated to tenths of percent.[50]

The final issues which merit discussion are raised only by Harris County. Several of the agency's promulgated regulations direct the state to institute a particular program, such as an inspection system. This contrasts with the typical regulation which is directed at private individuals, for example, prohibiting them from filling automobile gasoline tanks without employing vapor recovery mechanisms. Harris County contends that Congress empowered the agency only to promulgate regulations affecting private parties and to enforce them should the state refuse to do so. It was not intended, claims Harris County, that the agency should have the power to require specific legislative acts by states. The county further contends that even if Congress attempted to delegate such power, doing so would violate constitutional principles of federalism and state sovereignty.

These are weighty issues. However, they are not properly before this court and we decline to consider them. There are two reasons for this disposition. The first is that these issues were not raised below. The agency was thus accorded no opportunity to evaluate these contentions as to the limitations on its power, and to adapt its regulations accordingly.[51] Second, this objection to the regula-

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50. If the figures in note (38) are rounded off, the 75 per cent Region 7 target is achieved without reliance on the land-use and transportation regulations (1.5 is rounded up because the decimal portion of the actual quotient exceeds .5, but in note (38) was rounded down to that figure; the same is true of the 65.5 per cent reduction which the EPA credits to the state's plan).

51. It should be recognized that according to the EPA's view of its statutory power the effect of these objections goes principally to the form of the regulations and not their permissible substance.

tions has not been raised by the state of Texas. We do not think it appropriate to consider the issue in these circumstances, for we interpret the state's silence as indication of its willingness to adopt the regulations if they are otherwise valid.

SUMMARY

We will now summarize the effect of our various rulings for each region. Where a regulation affects several regions, a statement pertaining to it is relevant only for the region being summarized.

[321]

Region 3 (Austin-Waco)

An extension of the date for attaining the national ambient air standard for oxidants shall be granted. The agency's additional regulations, § 52.2283 (extension of Texas Regulation V) and § 52.2286 (vapor recovery during gasoline marketing operations), are invalid.

Had the agency been impressed by Harris County's contention that it is beyond agency power to require that the state institute a vehicle inspection program, the EPA could have sought the state's "voluntary" cooperation by promulgating measures which it considered to be well within its power. For example, it could have directed its regulation at individual drivers, prohibiting their use of vehicles which have not obtained a state permit pursuant to an emissions inspection. (This is the format for the Region 7 regulation controlling new emission sources). Alternatively, the agency could have promulgated regulations giving the state the option of instituting an inspection program or having the agency accomplish an equivalent emissions reduction through less desirable measures which it could administer such as gas rationing at the wholesale level. *Cf.* Commonwealth of Pennsylvania v. Environmental Protection Agency, 3 Cir., 1974, 500 F.2d 246, on these issues.

Region 7 (Houston-Galveston)

The land-use (§ 52.2292) and transportation (52.2293-52.2297) regulations shall be deferred pending agency reconsideration of its refinery reactivity factor. Additional regulations shall be similarly deferred as necessary to accumulate deferred reductions of at least 0.9 per cent, in accordance with page 311 of this opinion. Subject to the conditions of the preceding sentence, regulations 52.2284 (degreasing operations), 52.2285 (vapor recovery during the filling of service station storage tanks), 52.2287 (ship and barge controls), 52.2290 (vehicle inspection and maintenance), and 52.2291 (retrofit of pre-1968 automobile) are valid and enforceable. Regulation 52.2288 (vapor recovery during vehicle refueling) must be reconsidered before it can take effect.

Region 8 (Dallas-Fort Worth)

An extension of the date for compliance with the national ambient air quality oxidant standard shall be granted for this region. The gasoline marketing regulations (52.2285 and 52.2289) are invalid. Regulation 52.-2283, requiring extension of Texas Regulation V to Tarrant County, is valid and enforceable.

Region 9 (San Antonio)

The transportation regulations (52.2293, 52.2294, 52.2296, and 52.2297) shall be deferred pending agency reconsideration of its refinery reactivity factor. Regulations 52.2284 (degreasing operations), 52.2285 (vapor recovery during the filling of service station storage tanks), and 52.2290 (vehicle inspection and maintenance program) are valid and enforceable. Regulation 52.2288

(vapor recovery during vehicle refueling) must be reconsidered before it can take effect.

Region 11 (El Paso)

The only additional regulations applicable to this Region, §§ 52.2286 and 52.2288 (vapor recovery during gasoline marketing operations) are deferred pending agency reconsideration of its refinery reactivity factor. Whatever may be the result of this process the agency may not repromulgate these regulations prior to reconsidering the state's application for an extension of the date for compliance with the national standard for oxidants. Further, regulation 52.2288 (vapor recovery during vehicle refueling) must itself be reconsidered before it can take effect.

In Regions 3 and 8 the Administrator shall make the determination required, by 42 U.S.C.A. § 1857c-5(e)(2)(B), as a result of our order that extensions be granted. In Region 8 the promulgated interim transportation regulations (52.2294, 52.2296, and 52.2297) shall be reconsidered.

The Petitions to review are granted in part and denied in part.

CLARK, Circuit Judge, with whom BOYLE, District Judge, joins, specially concurring.

I concur without reservation in the entirety of Judge Bell's thoroughgoing, able opinion. The sole purpose of this addendum is to highlight the adverse effects flowing from the legislative mandate that judicial review proceedings be injected into the court system at the appellate level.

No formal hearing has ever been held in this highly technical, factually complex matter. The administrative "record" upon which we had to base our review was comprised of only the sparest of documentation, for it essentially evolved from an act of agency rule-making. To accentuate the problem the agency contracted the services of a private firm for the formulation of most of the rule requirements it ultimately

[322]

adopted here, so that not even intra-agency background for these actions was available. The writing judge was required to hold both pre and post-argument conferences with counsel for the parties to enable the three of us as a court to comprehend the substance of the issues and conduct a minimally meaningful review.

The subject matter of this action involves the health and welfare of millions of citizens, the continued business vitality of tens of thousands of firms and compliance expenditures costing billions of dollars.

These extensive rights deserve a more orderly process of judicial reflection.

APPENDIX B

IN THE
UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

NO. 73-3540

STATE OF TEXAS, ET AL.,
Petitioners,

versus

ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

Petition for Review of Orders of the Environmental Protection Agency (Texas Case)

ON PETITIONS FOR REHEARING

(Filed February 19, 1975)

Before BELL and CLARK, Circuit Judges and BOYLE, District Judge.

PER CURIAM:

IT IS ORDERED that the petitions for rehearing filed in the above entitled and numbered cause by Exxon Corporation, et al., Dow Chemical Company, and Texas Chemical Council, respectively, be and the same are hereby DENIED.

APPENDIX C

IN THE
UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 73-3540

STATE OF TEXAS, ET AL.,
Petitioners,

versus

ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

Petition for Review of Orders of the Environmental Protection Agency (Texas Case)

(Filed April 3, 1975)

Before BELL and CLARK, Circuit Judges and BOYLE, District Judge.

BY THE COURT:

IT IS ORDERED that the motion of petitioners, Exxon Corporation, et al., for leave to file a second petition for rehearing is granted. The petition is denied.

IT IS FURTHER ORDERED that the motion of petitioners, Exxon Corporation, et al., for stay of mandate

pending final disposition of all issues and for clarification of judgment is denied.

IT IS FURTHER ORDERED that the motion of petitioners, Harris County and Harris County Hospital District for stay of mandate pending final disposition of all issues and for clarification of judgment is denied.

IT IS FURTHER ORDERED that the motion of petitioners, Harris County and Harris County Hospital District, for stay of mandate pending the timely filing and disposition of an application for writ of certiorari to the United States Supreme Court is denied.

Having declared certain of the regulations in issue invalid and others valid in our decision of August 5, 1974, *State of Texas v. Environmental Protection Agency*, 5 Cir., 1974, 499 F.2d 289, and having retained jurisdiction as to and only as to those matters deferred in that opinion for reconsideration by Respondent Environmental Protection Agency, the mandate of this court shall issue twenty days from the date hereof.

The stay order of this court dated February 28, 1974 is dissolved effective on the issuance of the mandate except as to those matters deferred for reconsideration as aforesaid.

IT IS SO ORDERED this 3rd day of April, 1975.

APPENDIX D

EPA REGULATIONS (40 C.F.R.)

§ 52.2287 Ship and barge loading and unloading facilities.

(a) Rule 503.2 of the Texas Air Control Board Regulation V as incorporated by reference on May 31, 1972 (37 FR 10842) is amended to read: "All loading and unloading facilities for crude oil or condensate are exempt from Rule 503." This amendment eliminates an exemption for ships and barges.

(b) This section is applicable to ships and barges which use the port facilities within the Houston-Galveston Intrastate Region.

(c) Except as provided in paragraph (d) of this section, the owner or operator of a source subject to paragraph (a) of this section shall comply with the increments contained in the following compliance schedule.

(1) Contracts for emission control systems or process modifications not later than March 31, 1974.

(2) Initiation of on-site construction or installation of emission control equipment or process change must begin not later than July 31, 1974.

(3) On-site construction or installation of emission control equipment or process modification must be completed not later than March 31, 1975.

(4) Final compliance is to be achieved not later than May 31, 1975.

(5) Any owner or operator of stationary sources subject to the compliance scheduled in this paragraph shall certify to the Administrator, within five days after the

deadline for each increment of progress, whether or not the required increment of progress has been met.

(d) Paragraph (c) of this section shall not apply:

(1) To a source which is presently in compliance with paragraph (a) of this section and which has certified such compliance to the Administrator by January 1, 1974. The Administrator may request whatever supporting information he considers necessary for proper certification.

(2) To a source for which a compliance schedule is adopted by the Administrator.

(3) To a source whose owner or operator submits to the Administrator by January 1, 1974, a proposed alternative schedule. No such schedule may provide for compliance after May 31, 1975. If approval is promulgated by the Administrator, such schedule shall satisfy the requirements of this section for the affected source.

(e) Nothing in this section shall preclude the Administrator from promulgating a separate schedule for any source to which the application of the compliance schedule in paragraph (c) of this section fails to satisfy the requirements of § 51.15 (b) and (c) of its charter.

[38 FR 38645, Nov. 6, 1973]

TEXAS AIR CONTROL BOARD REGULATIONS

Rule 503. Volatile Carbon Compounds Loading and Unloading Facilities.

503.1 No person shall permit the loading or unloading of volatile carbon compounds from any loading facility having 20,000 gallons or more throughput per day, averaged over any 30-day period, unless such facility is equipped with a vapor

recovery system which reduces the emissions such that the aggregate partial pressure of all volatile carbon compound vapors in vent gases or other material emitted to the atmosphere will not exceed a level of 1.5 psia.

When loading or unloading is effected through the hatches of a tank truck or trailer or railroad tank car with a loading arm equipped with a vapor collecting adaptor, then pneumatic, hydraulic, or other mechanical means shall be provided to force a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid drainage from the loading device when it is removed from the hatch of any tank truck, trailer or railroad tank car, to accomplish complete drainage before such removal. When loading or unloading is effected through means other than hatches, all loading and vapor lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected or equipped to permit residual volatile carbon compounds in the loading line to discharge into a recovery or disposal system after loading is complete.

503.2 All loading or unloading facilities for crude oil or condensate and for ships and barges are exempt from Rule 503.

APPENDIX E

Section 110(a)(2) of Clean Air Act,
(42 U.S.C. § 1857c-5(a)(2))

(2) The Administrator shall, within four months after the date required for submission of a plan under paragraph (1), approve or disapprove such plan for each portion thereof. The Administrator shall approve such plan, or any portion thereof, if he determines that it was adopted after reasonable notice and hearing and that—

(A)(i) in the case of a plan implementing a national primary ambient air quality standard, it provides for the attainment of such primary standard as expeditiously as practicable but (subject to subsection (e) in no case later than three years from the date of approval of such plan (or any revision thereof to take account of a revised primary standard), and (ii) in the case of a plan implementing a national secondary ambient air quality standard, it specifies a reasonable time at which such secondary standard will be attained;

(B) it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard, including, but not limited to, land-use and transportation controls;

(C) it includes provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality and, (ii)

upon request, make such data available to the Administrator;

(D) it includes a procedure, meeting the requirements of paragraph (4), for review (prior to construction or modification) of the location of new sources to which a standard of performance will apply;

(E) it contains adequate provisions for intergovernmental cooperation, including measures necessary to insure that emissions of air pollutants from sources located in any air quality control region will not interfere with the attainment or maintenance of such primary or secondary standard in any portion of such region outside of such State or in any other air quality control region;

(F) it provides (i) necessary assurances that the State will have adequate personnel, funding, and authority to carry out such implementation plan, (ii) requirements for installation of equipment by owners or operators of stationary sources to monitor emissions from such sources, (iii) for periodic reports on the nature and amounts of such emissions; (iv) that such reports shall be correlated by the State agency with any emission limitations or standards established pursuant to this Act, which reports shall be available at reasonable times for public inspection; and (v) for authority comparable to that in section 303, and adequate contingency plans to implement such authority;

(G) it provides, to the extent necessary and practicable, for periodic inspection and testing of motor

vehicles to enforce compliance with applicable emission standards; and

(H) it provides for revision, after public hearings, of such plan (i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of achieving such primary or secondary standard; or (ii) whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements.

Section 110(c) of Clean Air Act,
(42 U.S.C. § 1857c-5(c))

(c) The Administrator shall, after consideration of any State hearing record, promptly prepare and publish proposed regulations setting forth an implementation plan, or portion thereof, for a State if —

(1) The State fails to submit an implementation plan for any national ambient air quality primary or secondary standard within the time prescribed,

(2) the plan, or any portion thereof, submitted for such State is determined by the Administrator not to be in accordance with the requirements of this section, or

(3) the State fails, within 60 days after notification by the Administrator or such longer period as he may prescribe, to revise an implementation plan

as required pursuant to a provision of its plan referred to in subsection (a)(2)(H).

If such State held no public hearing associated with respect to such plan (or revision thereof), the Administrator shall provide opportunity for such hearing within such State on any proposed regulation. The Administrator shall, within six months after the date required for submission of such plan (or revision thereof), promulgate any such regulations unless, prior to such promulgation, such State has adopted and submitted a plan (or revision) which the Administrator determines to be in accordance with the requirements of this section.

APPENDIX F

Ports and Waterways Safety Act of 1972
(46 U.S.C. § 391(a))

§ 391a. Vessels carrying certain cargoes in bulk

(1) Statement of Policy.—The Congress hereby finds and declares—

That the carriage by vessels of certain cargoes in bulk creates substantial hazards to life, property, the navigable waters of the United States (including the quality thereof) and the resources contained therein and of the adjoining land, including but not limited to fish, shellfish, and wildlife, marine and coastal ecosystems and recreational and scenic values, which waters and resources are hereafter in this section referred to as the "marine environment."

That existing standards for the design, construction, alteration, repair, maintenance and operation of such vessels must be improved for the adequate protection of the marine environment.

That it is necessary that there be established for all such vessels documented under the laws of the United States or entering the navigable waters of the United States comprehensive minimum standards of design, construction, alteration, repair, maintenance, and operation to prevent or mitigate the hazards to life, property, and the marine environment.

(2) Vessels Included.—All vessels, regardless of tonnage size, or manner of propulsion, and whether self-propelled or not, and whether carrying freight or passengers for hire or not, which are documented under the laws of the United States or enter the navigable waters of the

United States, except public vessels other than those engaged in commercial service, that shall have on board liquid cargo in bulk which is—

(A) inflammable or combustible, or

(B) oil, of any kind or in any form, including but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil, or

(C) designated as a hazardous polluting substance under section 1162(a) of Title 33;

shall be considered steam vessels for the purposes of title 52 of the Revised Statutes of the United States and shall be subject to the provisions thereof: *Provided,* That this section shall not apply to vessels having on board the substances set forth in (A), (B), or (C) above only for use as fuel or stores or to vessels carrying such cargo only in drums, barrels, or other packages: *And provided further,* That nothing contained herein shall be deemed to amend or modify the provisions of section 4 of Public Law 90-397 with respect to certain vessels of not more than five hundred gross tons: *And provided further,* That this section shall not apply to vessels of not more than five hundred gross tons documented in the service of oil exploitation which are not tank vessels and which would be subject to this section only because of the transfer of fuel from the vessels' own fuel supply tanks to offshore drilling or production facilities.

(3) Rules and Regulations.—In order to secure effective provision (A) for vessel safety, and (B) for protection of the marine environment, the Secretary of the department in which the Coast Guard is operating (hereafter referred to in this section as the "Secretary") shall

establish for the vessels to which this section applies such additional rules and regulations as may be necessary with respect to the design and construction, alteration, repair, and maintenance of such vessels, including, but not limited to, the superstructures, hulls, places for stowing and carrying such cargo, fittings, equipment, appliances, propulsive machinery, auxiliary machinery, and boilers thereof; and with respect to all materials used in such construction, alteration, or repair; and with respect to the handling and stowage of such cargo, the manner of such handling or stowage, and the machinery and appliances used in such handling and stowage; and with respect to equipment and appliances for life saving, fire protection, and the prevention and mitigation of damage to the marine environment; and with respect to the operation of such vessels; and with respect to the requirements of the manning of such vessels and the duties and qualifications of the officers and crew thereof; and with respect to the inspection of all the foregoing. In establishing such rules and regulations the Secretary may, after hearing as provided in subsection (4), adopt rules of the American Bureau of Shipping or similar American classification society for classed vessels insofar as such rules pertain to the efficiency of hulls and the reliability of machinery of vessels to which this section applies. In establishing such rules and regulations, the Secretary shall give due consideration to the kinds and grades of such cargo permitted to be on board such vessel. In establishing such rules and regulations the Secretary shall, after consultation with the Secretary of Commerce and the Administrator of the Environmental Protection Agency, identify those established for protection of the marine environment and those established for vessel safety.

(4) Adoption of Rules and Regulations.—Before any rules or regulations, or any alteration, amendment, or repeal thereof, are approved by the Secretary under the provisions of this section, except in an emergency, the Secretary shall (A) consult with other appropriate Federal departments and agencies, and particularly with the Administrator of the Environmental Protection Agency and the Secretary of Commerce, with regard to all rules and regulations for the protection of the marine environment, (B) publish proposed rules and regulations, and (C) permit interested persons an opportunity for hearing. In prescribing rules or regulations, the Secretary shall consider, among other things, (i) the need for such rules or regulations, (ii) the extent to which such rules or regulations will contribute to safety or protection of the marine environment, and (iii) the practicability of compliance therewith, including cost and technical feasibility.

(5) Rules and Regulations for Safety; Inspection; Permits; Foreign Vessels.—No vessel subject to the provisions of this section shall, after the effective date of the rules and regulations for vessel safety established hereunder, have on board such cargo, until a certificate of inspection has been issued to such vessel in accordance with the provisions of title 52 of the Revised Statutes of the United States and until a permit has been endorsed on such certificate of inspection by the Secretary, indicating that such vessel is in compliance with the provisions of this section and the rules and regulations for vessel safety established hereunder, and showing the kinds and grades of such cargo that such vessel may have on board or transport. Such permit shall not be endorsed by the Secretary on such certificate of inspection until such vessel has been inspected by the Secretary and found to be in compliance with

the provisions of this section and the rules and regulations for vessel safety established hereunder. For the purpose of such inspection, approved plans and certificates of class of the American Bureau of Shipping or other recognized classification society for classed vessels may be accepted as evidence of the structural efficiency of the hull and the reliability of the machinery of such classed vessels except as far as existing law places definite responsibility on the Coast Guard. A certificate issued under the provisions of this section shall be valid for a period of time not to exceed the duration of the certificate of inspection on which such permit is endorsed, and shall be subject to revocation by the Secretary whenever he shall find that the vessel concerned does not comply with the conditions upon which such permit was issued: *Provided,* That rules and regulations for vessel safety established hereunder and the provisions of this subsection shall not apply to vessels of a foreign nation having on board a valid certificate of inspection recognized under law or treaty by the United States: *And provided further,* That no permit shall be issued under the provisions of this section authorizing the presence on board any vessel of any of the materials expressly prohibited from being thereon by subsection (3) of section 170 of this title.

(6) Rules and Regulations for Protection of the Marine Environment; Inspection; Certification.—No vessel subject to the provisions of this section shall, after the effective date of rules and regulations for protection of the marine environment, have on board such cargo, until a certificate of compliance, or an endorsement on the certificate of inspection for domestic vessels, has been issued by the Secretary indicating that such vessel is in compliance with such rules and regulations. Such certificate of

compliance or endorsement shall not be issued by the Secretary until such vessel has been inspected by the Secretary and found to be in compliance with the rules and regulations for protection of the marine environment established hereunder. A certificate of compliance or an endorsement issued under this subsection shall be valid for a period specified therein by the Secretary and shall be subject to revocation whenever the Secretary finds that the vessel concerned does not comply with the conditions upon which such certificate or endorsement was issued.

(7) Rules and Regulations for Protection of the Marine Environment Relating to Vessel Design and Construction, Alteration, and Repair; International Agreement.—(A) The Secretary shall begin publication as soon as practicable of proposed rules and regulations setting forth minimum standards of design, construction, alteration, and repair of the vessels to which this section applies for the purpose of protecting the marine environment. Such rules and regulations shall, to the extent possible, include but not be limited to standards to improve vessel maneuvering and stopping ability and otherwise reduce the possibility of collision, grounding, or other accident, to reduce cargo loss following collision, grounding, or other accident, and to reduce damage to the marine environment by normal vessel operations such as ballasting and deballasting, cargo handling, and other activities.

(B) The Secretary shall cause proposed rules and regulations published by him pursuant to subsection (7) (A) to be transmitted to appropriate international forums for consideration as international standards.

(C) Rules and regulations published pursuant to subsection (7)(A) shall be effective not earlier than January

1, 1974, with respect to foreign vessels and United States-flag vessels operating in the foreign trade, unless the Secretary shall earlier establish rules and regulations consonant with international treaty, convention, or agreement, which generally address the regulation of similar topics for the protection of the marine environment. In absence of the promulgation of such rules and regulations consonant with international treaty, convention, or agreement, the Secretary shall establish an effective date not later than January 1, 1976, with respect to foreign vessels and United States-flag vessels operating in the foreign trade, for rules and regulations previously published pursuant to this subsection (7) which he then deems appropriate. Rules and regulations published pursuant to subsection (7)(A) shall be effective not later than June 30, 1974, with respect to United States-flag vessels engaged in the coastwise trade.

(D) Any rule or regulation for protection of the marine environment promulgated pursuant to this subsection (7) shall be equally applicable to foreign vessels and United States-flag vessels operating in the foreign trade. If a treaty, convention, or agreement provides for reciprocity of recognition of certificates or other documents to be issued to vessels by countries party thereto, which evidence compliance with rules and regulations issued pursuant to such treaty, convention, or agreement, the Secretary, in his discretion, may accept such certificates or documents as evidence of compliance with such rules and regulations in lieu of the certificate of compliance otherwise required by subsection (6) of this section.

(8) Shipping Documents.—Vessels subject to the provisions of this section shall have on board such shipping

documents as may be prescribed by the Secretary indicating the kinds, grades, and approximate quantities of such cargo on board such vessel, the shippers and consignees thereof, and the location of the shipping and destination points.

(9) Officers; Tankermen; Certification.—(A) In all cases where the certificate of inspection does not require at least two licensed officers, the Secretary shall enter in the permit issued to any vessel under the provisions of this section the number of the crew required to be certified as tankermen.

(B) The Secretary shall issue to applicants certificates as tankermen, stating the kinds of cargo the holder of such certificate is, in the judgment of the Secretary, qualified to handle aboard vessels with safety, upon satisfactory proof and examination, in form and manner prescribed by the Secretary, that the applicant is in good physical condition, that such applicant is trained in and capable efficiently to perform the necessary operations aboard vessels having such cargo on board, and that the applicant fulfills the qualifications of tankermen as prescribed by the Secretary under the provisions of this section. Such certificates shall be subject to suspension or revocation on the same grounds and in the same manner and with like procedure as is provided in the case of suspension or revocation of licenses of officers under the provisions of section 239 of this title.

(10) Effective Date of Rules and Regulations.—Except as otherwise provided herein, the rules and regulations to be established pursuant to this section shall become effective ninety days after their promulgation unless the Secretary shall for good cause fix a different time.

If the Secretary shall fix an effective date later than ninety days after such promulgation, his determination to fix such a later date shall be accompanied by an explanation of such determination which he shall publish and transmit to the Congress.

(11) Penalties.—(A) The owner, master, or person in charge of any vessel subject to the provisions of this section, or any or all of them, who shall violate the provisions of this section, or the rules and regulations established hereunder, shall be liable to a civil penalty of not more than $10,000.

(B) The owner, master, or person in charge of any vessel subject to the provisions of this section, or any or all of them, who shall knowingly and willfully violate the provisions of this section or the rules and regulations established hereunder, shall be subject to a fine of not less than $5,000 or more than $50,000, or imprisonment for not more than five years, or both.

(C) Any vessel subject to the provisions of this section, which shall be in violation of this section or the rules and regulations established hereunder, shall be liable in rem and may be proceeded against in the United States district court for any district in which the vessel may be found.

(12) Injunctive Proceedings.—The United States district courts shall have jurisdiction for cause shown to restrain violations of this section or the rules and regulations promulgated hereunder.

(13) Denial of Entry.—The Secretary may, subject to recognized principles of international law, deny entry into the navigable waters of the United States to any

vessel not in compliance with the provisions of this section or the regulations promulgated thereunder.

As amended July 11, 1968, Pub.L. 90—397, § 4, 82 Stat. 341; July 10, 1972, Pub.L. 92-340, Title II, § 201, 86 Stat. 427, Nov. 16, 1973, Pub.L. 93-153, Title IV, § 401, 87 Stat. 589.

* * *

APPENDIX G

ENVIRONMENTAL PROTECTION AGENCY
RULES AND REGULATIONS

Federal Register

June 5, 1975

[FRL 382-6]

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

Ship and Barge Recovery

On November 6, 1973, the Administrator promulgated a final regulation requiring recovery of vapors emitted during loading and unloading of gasoline and other volatile compounds from ships and barges in the Houston-Galveston Intrastate Air Quality Control Region, 40 CFR 52.2287 (38 FR 30633). The purpose of the regulation is to reduce hydrocarbon emissions and thereby to assist in attainment and maintenance of the national ambient air quality standard for photochemical oxidants in that region.

The regulation was challenged by a number of companies subject to it, but was held "valid and enforceable" by the U.S. Court of Appeals for the Fifth Circuit on August 7, 1974. *State of Texas, et al. v. EPA,* 499 F.2d 289, 316-17, 321. Petitions for rehearing were filed, but were denied by the Court. Petitioners filed with the U.S. Supreme Court motions for stay of mandate pending applications for writ of certiorari. The motions were denied on April 28, 1975. The mandate was issued by the Fifth Circuit on April 30, 1975:

On April 25, 1975, the Administrator suspended interim compliance dates contained within the regulation and

which had already passed, namely 40 CFR 52.2287(c)(1), (2), and (3), (40 CFR 18437). That notice, however, did not suspend the final compliance date of May 31, 1975, § 52.2287(c)(4).

The Agency is currently engaged in an examination of various aspects of the regulation, including, but not limited to the proper extent of any extensions to the interim and final compliance dates contained in the regulation. In this regard the Agency has requested pertinent information from those subject to the regulation, pursuant to section 114 of the Clean Air Act. The information that has been received, regarding both technical issues and information on past efforts, is now being evaluated and the Agency intends to publish proposed amendments to the regulation within the near future.

In the meantime, the Agency has decided to suspend the final compliance date of May 31, 1975 (40 CFR 52.2287(c)(4)). The final compliance date will be suspended until October 1, 1975. This action will allow the Agency to proceed in an orderly fashion to consider the information now before it. This action does not, however, relieve those subject to the regulation from the obligation to continue to make maximum good faith efforts to comply with the substantive portions of the regulation.

The suspension will be in effect until October 1, 1975, by which time the Administrator plans to publish in final form amendments to the regulation.

(Sec. 301, Clean Air Act, 42 U.S.C. 1857g)

Dated: May 30, 1975.

RUSSELL E. TRAIN,
Administrator.

[FR Doc. 75-14773 Filed 6-4-75; 8:45 am]

APPENDIX H

STATE OF TEXAS §
COUNTY OF HARRIS §

AFFIDAVIT

My name is Robert E. Payne. I am the Technical Manager of the Baytown Refinery Refining Department, Exxon Company, U.S.A., a division of Exxon Corporation. In this capacity I have carefully read and familiarized myself with Section 52.2287 of the Texas Transportation Control Plan entitled "Ship and Barge Loading and Unloading Facilities," promulgated by the Environmental Protection Agency and found at page 30645 of Volume 38 of the Federal Register.

After studying the impact of this regulation on Exxon's Baytown Refinery, I would submit the following statement with regard to Exxon's ability to design, develop, construct and operate facilities in order to comply with Section 52.2287:

1. We have studied possible system designs to collect and recover hydrocarbon vapors at the Baytown Refinery, assuming that the affected ships and barges can be appropriately modified to deliver the vapors onshore to an Exxon refinery recovery facility, and have concluded that the condensation system offers the most promise. However, we estimate that the total vapor emitted from the vessels during loading at the Baytown Refinery is equivalent, on the average, to 40 barrels per day of product, or less. Equipment for recovering this small amount of vapor through the condensation system would require a refining capital investment of approximately $5,000,000.00 for

onshore facilities. This does not include the capital investment for vessel modifications required of Exxon and the owners of vessels and barges loading products at the Refinery docks. The annual operating cost, including maintenance, is approximately $450,000.00.

2. I am concerned that a condensation system on the scale required may not be adequately safe to prevent a flashback through the vapor recovery system which almost certainly would cause serious explosions resulting in possible loss of life and substantial property damage to onshore facilities and vessels. While the condensation system of vapor recovery has been applied to tank trucks and railroad cars, no such system has been adapted for ships and barges in this country as it is not at all certain that a proper and safe system could be designed on the extremely large scale required. For example, the ships that would come under this regulation carry an average of 50,000 tons of product at one time. This is compared with railroad cars or tank trucks that carry 20-90 tons of product. Thus, it is necessary that the safety hazards and design problems involved be carefully analyzed by not only Exxon but the United States Coast Guard to insure that any system installed is as near 100% failproof as possible.

Thus, my conclusion is that vapor recovery of the magnitude and type required is not demonstrated, available technology. Moreover, I cannot be certain that, even after exhaustive study, it will be possible to design a system which is both practical and safe and will meet the United States Coast Guard safety requirements.

3. Assuming that the basic design technology is available for tank trucks and railroad cars and could be

adapted to an operation such as the Baytown terminal for ships and barges, it will be necessary for Exxon to take enough time to adapt this technology and to develop and design a workable, safe system before the construction of such a system can be contracted for and initiated. It is difficult to estimate the exact amount of lead time necessary to properly design and engineer such a system, but it cannot be less than 12 to 18 months. Furthermore, based on extensive current experience with material availability and fabrication, the estimated minimum procurement and construction time is approximately 30 months, beginning after the design period.

Assuming that a safe, practical system can ever be designed, my best estimate regarding the necessary lead time before compliance could be achieved is as follows:

- Exxon could not possibly award contracts before December 1975 — June 1976.
- Onsite construction could not possibly begin until June — December 1977.
- Construction will not be completed before June — December 1978.
- Final compliance (assuming a 30-day period for start-up operations) would not be before July, 1978 — January, 1979.

Moreover, this schedule requires that a full scale system be designed immediately and assumes that this initial system will be operable and safe.

4. The Baytown Refinery, one of the nation's largest, produces between 300,000 and 400,000 barrels of petroleum products per day, including automotive and jet fuels,

home heating oils, lubricants, and solvents. Approximately 70% of these products are transported from the refinery in ships and barges. About 38% of the products transported by ships and barges would be classified as volatile carbon compounds and subject to the requirements of Section 52.2287. Other vessel shipments would be affected because these vessels take on mixed cargoes of volatile and non-volatile products and would require modification, although the shipment may be substantially non-volatile. In addition to Exxon-owned vessels, volatile products were transported in approximately 100 non-Exxon ships and numerous non-Exxon barges during the past three years and therefore these vessels would also have to be modified if they are to continue to load products at Exxon docks. Since, to my knowledge, the Houston-Galveston Air Quality Control Region is the only region in the United States being required to recover vapor from ships and barges, the owners of non-Exxon vessels may prefer not to contract with Exxon or its purchasers to ship these products via their vessels rather than make the costly vessel modifications, which would be required. If this should happen, Exxon would either have to find alternative methods of shipping these products or be unable to supply its customers. Alternate means of transporting this very large volume of products, such as railcars, pipelines, and constructing additional Exxon vessels, are not now available and cannot be made available in the near future.

On this 15th day of April, 1975.

/s/ ROBERT E. PAYNE
ROBERT E. PAYNE

THE STATE OF TEXAS)
COUNTY OF HARRIS)

Before me, the undersigned authority, on this day personally appeared Mr. Robert E. Payne, who being by me first duly sworn, stated upon his oath that he is Technical Manager of the Baytown Refinery, Refining Department, Exxon Company, U.S.A., a division of Exxon Corporation, that he has voluntarily prepared the foregoing Affidavit, that he is authorized to do so, and that the information contained in this Affidavit is true and correct to the best of his information and belief.

/s/ ROBERT E. PAYNE
ROBERT E. PAYNE

Subscribed and sworn to before me this the 15th day of April, 1975.

/s/ MARTHA P. EILERS
MARTHA P. EILERS
Notary Public in and for
Harris County, Texas

APPENDIX I

AFFIDAVIT

THE STATE OF TEXAS:

SS

COUNTY OF HARRIS:

BEFORE ME, the undersigned authority, on this day personally came and appeared William B. Boykin, who being placed upon his oath did depose and say as follows:

I am William B. Boykin, an employee of Shell Oil Company in Houston, Texas. I am presently Staff Engineer, Major Projects - Operations (Marine Facilities). As Staff Engineer, Major Projects - Operations (Marine Facilities), I have reviewed the EPA regulation, 40 C.F.R. § 52.2287, entitled "Ship and Barge Loading and Unloading Facilities" as found at page 30645 of Volume 38 of the Federal Register. After consideration of this regulation, I submit the following statements with regard to Shell Oil Company's ability to comply with the compliance dates set forth in § 52.2287:

1. Even though Shell Oil Company has been working diligently towards development of a hydrocarbon vapor control system which would comply with the requirements of § 52.2287, Shell will not be able to meet the final compliance date of May 31, 1975, with respect to its refinery in Houston, Texas. Moreover, it has been and continues to be impossible for Shell to comply with the three earlier interim dates; March 31, 1974, for the letting of contracts, July 31, 1974, for the initiation of construction and March 31, 1975, for completion of construction. Further, at this time we estimate that the minimum time needed to engineer, procure equipment, and

construct the vapor control system would be approximately thirty months.

2. Shell's initial engineering and design work for the development of a vapor recovery system was based upon a literal interpretation of the regulation, i.e., a hydrocarbon emission control device is required to reduce the hydrocarbon content of the vented vapors to a hydrocarbon partial pressure of 1.5 psi, which is equivalent to a 10.2% volume concentration. At a meeting of various industry representatives at Baytown, Texas, on December 13, 1974, at which I was in attendance, representatives of the Environmental Protection Agency indicated that § 52.2287 required an 85% reduction in hydrocarbon emissions during the loading of ships and barges. Because this 85% emission reduction requirement is a substantial departure from a literal interpretation of the regulation and would require considerable redirection of our engineering and design work, representatives from Shell met with Region VI EPA staff on January 10, 1975, to discuss the question of what is acceptable hydrocarbon control (See attached letter of January 21, 1975). At this meeting, the EPA staff requested additional information before they could resolve the question. The information was submitted February 14, 1975. We are awaiting word from the EPA to resume our discussions. Until this matter is resolved we are unable to make any material progress in the design, engineering, and installation of a vapor control system at our refinery.

3. Approximately 55% of the Shell Oil Company Houston Refinery production is shipped from Shell's docks located on the Houston Ship Channel. About one half of the products shipped over the docks, primarily motor gasoline, would be subject to the vapor recovery regulation.

There is no alternate means of transporting these products to their destination at this time.

WITNESS MY HAND this 27th day of March, 1975.

/s/ WILLIAM B. BOYKIN
William B. Boykin

SUBSCRIBED AND SWORN before me the undersigned authority on this 27th day of March, 1975.

/s/ M. G. JORDAN
Notary Public in and for
Harris County, Texas

(SEAL)

APPENDIX J

AFFIDAVIT

THE STATE OF TEXAS

COUNTY OF GALVESTON

BEFORE ME, the undersigned authority, on this day personally came and appeared, L. V. Durland, who being placed upon his oath did depose and say as follows:

I am L. V. Durland, an employee of Amoco Oil Company in Texas City, Texas. I am presently Plant Manager of the Texas City Refinery. As Plant Manager, I have reviewed the EPA regulation, 40 C.F.R., Section 52.2287, entitled "Ship and Barge Loading and Unloading Facilities" as found at page 30645 of Volume 38 of the Federal Register. After consideration of this regulation, I submit the following statements with regard to Amoco's ability to comply with the compliance dates set forth in Section 52.2287:

1. Even though Amoco has been working towards development of a vapor recovery system which would comply with the requirements of Section 52.2287, Amoco will not be able to meet the final compliance date of May 31, 1975, with respect to its refinery in Texas City, Texas. Moreover, it will be impossible for Amoco to comply with the three earlier interim dates, March 31, 1974, for the letting of contracts, July 31, 1974, for the initiation of construction, and March 31, 1975, for completion of construction, prior to May 31, 1975. If Amoco's proposed dry ice contactor system is found to be feasible and will comply with all applicable EPA and

Coast Guard requirements, the minimum time needed to engineer, procure equipment for and construct the system is estimated to be approximately two years. On the other hand, if a system other than the dry ice contactor system must be installed, the minimum time for achieving final compliance with the regulation, assuming all safety problems are satisfactorily resolved, is estimated to be approximately three and one-half to four years.

2. Amoco's initial research, engineering and design work for the development of a vapor recovery system was based upon a literal reading of the regulation that only hydrocarbon emissions having a 1.5 psia vapor pressure, which is equivalent to a 10.2% hydrocarbon concentration, need be controlled. At a meeting of various industry representatives at Baytown, Texas, on December 13, 1974, at which my representative was in attendance, representatives of the Environmental Protection Agency indicated that Section 52.2287 required an 85% reduction in hydrocarbon emissions during the loading of ships and barges. It was indicated by the EPA representatives at the meeting that a written clarification of, or an amendment to, the regulation might have to be made to implement this 85% emissions reduction requirement. I am presently unaware of any such written clarification of, or an amendment to, the regulation, and until one is received Amoco is uncertain as to how to design and engineer a vapor recovery system which would comply with the regulation. This 85% emission reduction requirement is a substantial departure from a literal reading of the regulation as indicated above and would require considerable redirection of our research, engineering and development work.

3. Approximately 11.9% (or 11,919,000 barrels in 1974) of Amoco Oil Company's Texas City Refinery's production is shipped by marine transportation and is subject to the provisions of Section 52.2287. Practical alternate means of transporting this large volume of product, such as by rail cars or pipelines, are not now available and cannot be made available in the near future.

WITNESS MY HAND this 15th day of April, 1975.

/s/ L. V. DURLAND
L. V. Durland

SUBSCRIBED AND SWORN before me the undersigned authority on this 15th day of April, 1975.

/s/ IRIS B. SOWELL
Iris B. Sowell, Notary Public
in and for Galveston County,
Texas

(SEAL)

APPENDIX K

AFFIDAVIT

State of California)
)
County of Los Angeles)

BEFORE ME, the undersigned authority, on this day personally came and appeared Harvey J. Grimes, who being placed upon his oath did depose and say as follows:

I am Harvey J. Grimes, an employee of Atlantic Richfield Company in Harvey, Illinois. I am presently Manager of Environmental Engineering. As Manager of Environmental Engineering, I have reviewed the EPA regulation, 40 C.F.R. Sec. 52.2287, entitled "Ship and Barge Loading and Unloading Facilities" as found at page 30645 of Volume 38 of the Federal Register. After consideration of this regulation, I submit the following statements with regard to Atlantic Richfield's ability to comply with the compliance dates set forth in Sec. 52.2287:

1. Even though Atlantic Richfield has been working towards development of a vapor recovery system which would comply with the requirements of Sec. 52.2287, Atlantic Richfield has not been able to develop or purchase a system with the necessary safety and emission reduction characteristics, and the requisite compatibility with diverse vessel configurations and operations. Therefore, it will not be able to meet the final compliance date of May 31, 1975 with respect to its refinery docks in Houston, Texas. Moreover, it will be impossible for Atlantic Richfield to comply with the three earlier interim dates, March 31, 1974 for the letting of contracts, and July 31, 1974 for the initiation of construction, and it will also be impossible to meet the final interim date of March 31, 1975 for completion of construction prior to May 31, 1975.

2. The projection of a time schedule for installing any systems which may be required for control of hydrocarbon emissions from loading ships and barges is speculative to the extent that Atlantic Richfield Company does not yet know how to insure that there will not be a source of ignition within the vapor transport and processing systems containing explosive vapors. Additionally, some delay may be occasioned by presently undefined problems of ship-to-shore interface compatibility between different shore or ship designs and by differing systems for to provide motive force for transporting the vapors. Our best estimate as of the present time, which assumes successful solutions to these and the remaining shore-side system problems, is none-the-less set forth below using the conceptual designs made to date as a basis:

	Shore-Side System, Months
Conceptual Designs and Data Acquisition	Continuing
Hazard Evaluation Studies	12
Finalize Design Basis	
Process Design	
Contractor Selection	
Mechanical Design and Specification	24*
Bid Solicitation and Contract Award	
Equipment Delivery and Construction	
Start-Up Debugging	2
Total	36*

* Additional time not here included for prototype testing and further hazard evaluation which will probably be required after hardware component selection.

3. Following the completion of shoreside system design specifications, modifications in design of equipment employed aboard vessels will be necessary and new types of equipment will have to be installed aboard vessels. Vessel equipment design and application approvals must be obtained from certain regulatory bodies. For vessels registered in the United States the U. S. Coast Guard is the approving authority. Vessels registered in other countries will require approvals from their respective authorities. Approvals from the U. S. Coast Guard might take as long as six months. Following U. S. Coast Guard approvals, procurement and manufacture of the equipment might take another six months. Installation aboard all vessels might not be completed for an additional two to three year period for ships and barges respectively. This timing will be determined by vessel dry-docking schedules and shipyard capabilities. More than one hundred and eighty seven (187) different vessels called at the Houston Refinery during the years 1972-1974 inclusive.

4. It appears, therefore, that following the completion of shoreside system design specifications, an additional four years would be required before *all* U.S. flag vessels could be fitted with the control hardware. For some portion of the vessels, considerably earlier fitting would be effected.

5. Atlantic Richfield's initial research, engineering and design work for the development of a vapor recovery system was based upon a literal reading of the regulation that only hydrocarbon emissions having a 1.5 psia vapor pressure, which is equivalent to a 10.2% hydrocarbon concentration, need be controlled. At a meeting of various industry representatives at Baytown, Texas, on December

13, 1974, at which I was in attendance, representatives of the Environmental Protection Agency indicated that Sec. 52.2287 required an 85% reduction in hydrocarbon emissions during the loading of ships and barges. It was indicated by the EPA representatives at the meeting that a written clarification of, or an amendment to, the regulation might have to be made to implement this 85% emission reduction requirement. I am presently unaware of any such written clarification of, or an amendment to, the regulation, and until one is received Atlantic Richfield is uncertain as to how to design and engineer a vapor recovery system which would comply with the regulation. This 85% emission reduction requirement is a substantial department from a literal reading of the regulation as indicated above and would require considerable redirection of our research, engineering and development work.

6. Approximately 15,020 barrels of the Atlantic Richfield Company Houston Refinery production is shipped by marine transportation and is subject to the provisions of Sec. 52.2287.

WITNESS MY HAND this 11th day of April, 1975.

/s/ HARVEY J. GRIMES
Harvey J. Grimes

SUBSCRIBED AND SWORN before me the undersigned authority on this 11th day of April, 1975.

/s/ MARILYN B. GROSS
Notary Public in and for
the County of Los Angeles

My Commission expires
Feb. 10, 1978

(SEAL)

APPENDIX L

April 18, 1975

Honorable Russell E. Train
Administrator
Environmental Protection Agency
401 M Street S. W.
Washington, D. C. 20460

Dear Judge:

I am taking the liberty of writing to you relative to the general subject of vessel atmospheric emissions and specifically with reference to your letter of 14 March 1975 to Mr. Larry Feldcamp of Houston, Texas.

At last week's Coast Guard's Towing Industry Advisory Committee meeting, the topic of Vapor Control Systems for tank vessels, Houston-Galveston, Texas area, was discussed at length. In this discussion, the members of that committee, as well as other representatives of the marine industry, identified a significant problem relative to the interpretation of the current requirements contained in 40 CFR 52.2273 specifically Section 503.1 of the Texas plan. These requirements as written apparently do not give a clear definition of just what is desired specifically as the end-product emission-wise of vapor control systems. Without a clear understanding of what standards are to be met, it is obviously very difficult to design such systems for compliance.

The Coast Guard has a vital interest in this matter since the installation of any equipment and/or the implementation of any system will bear directly on the safety of certificated tank vessels. This consideration of safety is of course of prime importance in any approach to this problem.

Members of my staff have attended meetings with the industry and the EPA on this matter both at Washington, D. C. and Houston, Texas. It is our desire to assist the EPA and the marine industry in whatever way that we can looking toward implementing safe systems which will provide the degree of pollution diminishment desired.

I am certain that you are vitally interested in this matter, in the timely development of these systems and insuring that any valid questions that we may have are appropriately addressed in a rapid time frame. In this vein, I would like to respectfully suggest that you and I with appropriate staff meet at a time convenient to you to discuss this topic and to specifically address the question of the adequacy of the definitions contained in the applicable regulations.

Please be assured that I would not be troubling you with this matter if it were not of importance and urgency.

Sincerely,

W. M. BENKERT
Rear Admiral U. S. Coast Guard
Chief, Office of Merchant Marine Safety

APPENDIX M

STATE OF TEXAS)
COUNTY OF HARRIS)

AFFIDAVIT

My name is Irwin Ginsburgh. I hold a Bachelor of Science degree (Physics) from the College of the City of New York, and a Doctor of Philosophy (Physics) degree from Rutgers University. I live in Morton Grove, Illinois, and am employed as a Research Associate in Amoco Oil Company's research and development department. I have been employed by Amoco Oil Company as a physicist for the past twenty-three years. I have been working in the field of hydrocarbon vapor recovery for the past few years and hold patents on vapor recovery systems and devices for use during truck loading and during service station underground tank filling.

The scientific and engineering literature presently available has almost no data concerning hydrocarbon vapor content of the air-vapor mixtures emitted from tanker and barge compartments during gasoline loading. This raises the technical question of the validity of the average loss of 0.0018 tons of vapor per ton of liquid handled[1] that was used by the Texas Air Control Board in calculating the 1970 emission inventory for ship and barge loading to be 27,778 tons/yr of total hydrocarbons.[2] The EPA used this total emission inventory number in their implementation plan calculations.[3]

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1. This factor was taken from EPA document AP-42, February 1972.

2. See Doc. 4, p. 278, and Texas 1970 Emission Inventory Summary.

3. See Doc. 30, p. 3406 and 3511.

Under my supervision, Amoco Oil Company undertook a measurement program to determine the quantity of hydrocarbon vapor emitted during the loading of gasoline into ships and barges. These measurements were started in February, 1974 and are still in progress. To date, we have measured hydrocarbon emissions during a dozen ship loadings. Hot weather can increase hydrocarbon vaporization, and only recently have we made measurements during hot weather.

Our measurements show that without vapor recovery facilities, the actual average vapor loss from our tankers at the Texas City loading docks is less than 0.0004 tons of vapor per ton of liquid handled. This 0.0004 number would indicate that the emission inventory number used by the Texas Air Control Board and EPA is approximately 4 times larger than actual emissions are. Significantly, the 0.0004 number corresponds to the allowed emission limit of 1.5 PSIA true vapor pressure specified by EPA Regulation 52.2287,[4] if this regulation applies to average emissions rather than maximum emissions.

Our measurements show that the concentration of hydrocarbon vapor in these emissions is not uniform. It can be as low as 1% at the start of loading; it remains low for most of the load and exceeds 10.2% only during the final 4 to 6 linear feet of loading. Concentrations of hydrocarbon vapors during the final linear foot of loading can exceed 50%.

If Regulation 52.2287 is to be applied to instantaneous concentrations exceeding 1.5 PSIA (0.0004 tons of vapor per ton of liquid handled or 10.2% by volume), then the

4. See Texas Air Control Board Regulation V, Rule 503.

volume of recovered hydrocarbons would be less than 1/3 to 1/5 the volume computed in the Texas and EPA implementation plans. Instead of Section 52.2287 resulting in a 2.7% reduction in hydrocarbon emission, a reduction of approximately 0.5%, and probably less, will actually result. The exact reduction to be achieved by this regulation can only be determined by further investigation.

Because the volume of recovered hydrocarbons is very low, the costs per recovered ton will increase drastically. These increased costs of recovered hydrocarbons raise questions concerning the cost-effectiveness of such a program.

On this 30th day of August, 1974.

/s/ IRWIN GINSBURGH
IRWIN GINSBURGH

STATE OF TEXAS)
COUNTY OF HARRIS)

Before me, the undersigned authority, on this day personally appeared Dr. Irwin Ginsburgh, who being by me first duly sworn, stated upon his oath that he is Research Associate with Amoco Oil Company, that he has voluntarily prepared the foregoing Affidavit, that he is authorized to do so, and that the information contained in this Affidavit is true and correct to the best of his information and belief.

/s/ IRWIN GINSBURGH
IRWIN GINSBURGH

SUBSCRIBED AND SWORN TO BEFORE ME this 29th day of August, 1974.

/s/ PATRICIA ANN RUSH
Notary Public in and for
Harris County, Texas